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Predictors of ADL disability in culturally diverse older adults

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PREDICTORS OF ADL DISABILITY
IN CULTURALLY DIVERSE OLDER ADULTS

A Thesis

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
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in

The Department of Kinesiology

by
Fernanda Holton
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ABSTRACT

Almost 42% of adults over 65 years of age live with at least one disability. Further, people of lower socioeconomic status and Blacks have greater risks for disability than Whites and individuals at higher socioeconomic status. The consequences of disability include loss of independence, decreased quality of life, increased chances of depression, consumption of health care services, and institutionalization. The purpose of this study was to utilize the disablement process framework to examine the contribution of physical function, dyspnea, and pain to disability in activities-of-daily-living (ADL) in culturally diverse older adults (i.e., diverse according to race, income, and education). Participants were 51 older adults (M age = 60.0 years, $SD = 9.7$) from an urban community center and an independent living housing facility for seniors with fixed incomes who completed the Functional Status Index (FSI), which provides ratings of need for assistance (FSIA) and pain (FSIP) with ADLs, the Continuous Scale Physical Functional Performance 10-item Test (CS-PFP10), and an analog dyspnea scale. Hierarchical multiple regression revealed that CS-PFP10 scores alone account for approximately 21% and 30% of the variance in FSIA scores of the participants from the community center and the housing facility, respectively. Adding FSIP and dyspnea ratings to the prediction model results in explaining an even higher portion of the variance in FSIA scores (36% in the community center and 53% in the housing facility). Based on this model, functional capacity improvement and pain and dyspnea prevention and management should be targeted when designing culturally appropriate strategies for delaying disability and maintaining independent life.

INTRODUCTION

Aging in America

There are approximately 35 million Americans 65 years of age and older, and this number is expected to grow rapidly within the next few decades reaching nearly 72 million by the year 2030 (He, Sengupta, Velkoff & DeBarros, 2005). Further, individuals 85 and older represent the fastest growing segment of the American population. As the first baby boomers reach their late years, the rising number of older Americans will generate vast social and economic impact (He et al., 2005).

The rise in the number of older adults is due to an increase in the birthrate during the 1950s, a general increase in life expectancy, and lower mortality rates among older adults (He et al., 2005). The elevated life expectancy and concomitant growth of the oldest-old cohort have also contributed to an escalating number of people living longer with chronic diseases and disabilities.

Interestingly, the profile of the older population is becoming more diverse. The current distribution of Blacks in the population of older adults is 8% and is projected to reach 10% by 2030; whereas, the number of non-Hispanic Whites is expected to decrease from 84% to 72% in the same time period (He et al., 2005). Furthermore, older minorities are more likely to live in poverty, have lower educational attainment, and experience higher rates of disability and functional limitation than older non-Hispanic Whites (He et al., 2005).

Prevalence of Disability and Dependence in Older Americans

As the population ages, the elevation in disability rates associated with aging becomes an important matter for research. According to the US Census 2000, almost 42% of the general population of adults over 65 years of age live with at least one disability (Waldrop & Stern,

2003). This rate of disability actually reflects a slightly lower prevalence of disability in older adults over the past two decades; however, the absolute number of adults living with disabilities is rising as a result of the growth of this segment of the population. Data from the U.S. Department of Health and Human Services (2004) indicate that the absolute number of disabled seniors has increased from 26.9 million in 1982 to 34.4 million in 2004.

Disability has detrimental consequences for the individual including loss of independence in activities of daily living (ADL) eroding feelings of esteem, increased chances of depression (Yang & George, 2005), overall mortality (Wolinsky, Stump, Callahan, & Johnson, 1996), and decreased quality of life (Wilson & Cleary, 1995). In addition to the major impact to the individual, the financial consequences of an increase in number of disabled older adults include added health care utilization, institutionalization, and excess burden for the families. The direct and indirect annual costs associated with disability in the American population are more than \$300 billion, or four percent of the gross domestic product (U.S. Department of Health and Human Services, 2004). Consequently, prevention, delay, and treatment of disability have become a top priority for public health and aging research.

Disability in Understudied Populations

According to the US Census Current Reports “Americans with Disabilities 2002” (Steinmetz, 2006), the prevalence of disability in Black persons is 19.8%. When compared with the other races, Blacks have the highest prevalence rate for severe disability (14%) and need for assistance (4.7%). Furthermore, the US Census Current Reports 65+ (He et al., 2005) reported that people of lower socioeconomic status and Blacks have greater risks for disability than Whites and individuals at higher socioeconomic status.

Research investigating the prevalence of disability among minorities corroborates the Census information. Mendes de Leon and associates (2005, 1997, & 1995) demonstrated a higher prevalence of disability and impaired physical function in older Blacks. They also noted that the discrepancy in disability levels was greater among women than men. Moreover, the racial discrepancies in ADL seem to be partially explained by cognitive function and socio-economic status (Moody-Ayers, Mentha, Lindquist, Sands, & Covinsky, 2005). Zsembick, Peek, and Peek (2000) examined ethnoracial differences in ADL and instrumental activities of daily living (IADL), and searched for the sites of the disablement process that are impacted in one race more than others. They observed that among non-Whites, chronic medical conditions and physical limitations have a considerable impact on disability levels. Finally, in a study of functional disability in community-living elders with low income, being Black was a major risk factor for poor ADL disability trajectory (Li, 2005). Other factors such as arthritis, cancer, and cognitive impairment moderately affected changes in ADL disabilities.

As a result of the fast growth of the older segments of the US population, disability has begun to receive more attention from geriatric and public health researchers. Nevertheless, one important area of study that necessitates more consideration is the process leading to disability in culturally heterogeneous populations. The current basic understanding of the process that leads to disability needs to be expanded through the explanation of which and how demographic, physical, psychological, and environmental features impact the disablement pathway.

Racial Crossover in Disability

Recently, the aging literature has revealed an interesting phenomenon concerning the prevalence of disability among Black elderly persons. While in general, Black older adults have a higher prevalence of disability, there seems to be a trend of decreasing racial difference with

increasing age, which is especially true among women (Mendes de Leon et al., 1995). The observed age at which Blacks begin to experience lower prevalence of disability varies from 75 to 86 years of age (Gibson, 1991; Johnson, 2000; Mendes de Leon et al., 1997).

The appearance of racial cross-over is not new. For over 40 years, researchers have observed racial cross-over concerning mortality and morbidity of certain diseases. In 1966, Adler, Bloss, and Mosley noticed that diabetes rates were much higher among Blacks until the age of 65 when they become almost identical to Whites. Cobb's work (1971) corroborated this ethnic-related trend with respect to rheumatoid arthritis. Johnson (2000) compared rates of comorbidity, disability, and mortality between Black and White individuals and found a racial crossover in comorbidity at age 76, in advanced ADL disability at age 86, and in mortality at age 81.

Gibson (1991) analyzed ten sets of data containing age, race, and health information and identified several racial trends. First he observed a younger group of Blacks (65 to 74 years of age) with health and functioning scores worse than the older Black group (75 to 79 years of age). Another finding of this study was a smaller Black ADL disadvantage in the age group 85 and older (e.g. bathing, dressing, climbing stairs, and walking half mile). A plausible explanation for this phenomenon is the adverse mortality selection process that indicates the less healthy and more disabled individuals die earlier, leaving a more select group of healthier and functional older adults (Manton, Patrick, & Johnson, 1987). This process may be accentuated among Blacks because of the higher death rates among younger groups. Cohort difference is another potential explanation for the racial crossover because most of the studies supporting this process are cross-sectional (Gibson, 1991).

In summary, the crossover effect describes a tendency of decreasing prevalence of disability with age in Blacks. Based on this crossover effect, observing young-old individuals can be

valuable to increase the understanding of factors underlying ADL disability in culturally diverse older adults. Consequently, studies of racial differences in aging populations may benefit from the inclusion of young-old and adults younger than the age of 65 years of age, commonly used as a limit for inclusion in aging studies.

Continuum of Disability: Difficulty to Dependence

Assessing physical disability in older adults is somewhat problematic. In general however, basic and instrumental activities of daily living (BADL and IADL, respectively) are accepted indicators of independent living. There is controversy, however, as to what questions better encompass the meaning of disability. Some researchers define disability as a need for assistance with ADLs (Ferrucci et al., 2000; Gill, Williams & Tinetti, 1995; van den Brink et al., 2003), while others define it as difficulty performing ADLs (Femia, Zarit & Johansson, 2001; Langlois et al., 1996; van Gool et al., 2005).

Difficulty and dependence are related constructs; however, they are not identical. Need for assistance is the most apparent indication of dependency and utilization of health care services, whereas measures of difficulty may have a closer relation with quality of life (Reuben et al., 1995). Further, assessing both difficulty and dependence appears to provide complimentary information about the wide spectrum of disability.

Gill, Robison, and Tinetti (1998) demonstrated the existence of a continuum of health care utilization. On one end of the continuum, older persons who are independent and have no difficulty with BADL utilize the least amount of health care, older persons who are BADL dependent rely on health care the most, and older adults who are independent, but have difficulty with BADL score between the two extremes. Studies examining determinants of disability

should include “need for assistance” as a primary outcome to identify older persons with a greater prospect of utilizing costly health care services.

REVIEW OF LITERATURE

Disability Models

Nagi's Model (Nagi, 1965)

The understanding of the pathway that leads to disability has evolved over the years. In 1965, Nagi's work originally addressed some of the conceptual inconsistencies concerning disability. He noted that the terminology used in the literature was frequently imprecise when discussing some closely related phenomena. Although some of the disability concepts overlap at times, there was need to separate them, and create a solid framework for future studies. Based on these observations, he developed the first model of disability, which identified the constructs of active pathology (disease process), impairments (anatomical and/or physiological abnormalities and losses), functional limitations (impairment reflection on performance of usual roles and daily activities), and disability (long-term impairment).

The International Classification of Impairments, Disabilities, and Handicaps (World Health Organization, 1980)

In 1980, the World Health Organization (WHO) directed attention to the subject of transition from health to disability by issuing "The International Classification of Impairments, Disabilities, and Handicaps" (ICIDCH). The ICIDCH promoted a framework for disability-related issues, identified the concepts of impairment, disability, and handicap, and made clear distinctions among them.

This document describes the pathway from impairment - attributed to acute and chronic illnesses - to disability and ultimately handicap. Impairment is defined as structural or functional abnormalities at the organ level. Disability concerns to the level of the whole person, and is the consequence of impairments on functional performance, thus causing a restriction or inability to perform activities. Handicap is the result of impairment or disability that causes a disadvantage

to the individual in his ability to fulfill the role that is expected from him, thus hindering the interaction between the individual and his surrounding.

In summary, the three central concepts of the ICIDCH are impairment (organ and body dimension), disability (individual dimension), and handicap (social dimension). This classification was later revised in a worldwide comprehensive consensus process producing the International Classification of Functioning, Disability, and Health (ICF) (WHO, 2004). The ICF is defined as a classification of health and health related domains that complement the International Classification of Diseases (ICD-10).

The ICIDCH, along with Nagi's models, have shed light on some of the major conceptual topics related to the main pathway of disability. Nonetheless, neither model specifically addresses risk factors and intra- and extra-personal predisposing factors in a comprehensive manner.

The Disablement Process

The conceptual model adopted for the current study is the disablement model proposed by Verbrugge and Jette (1994; see Figure 1). This model was based on Nagi's original conceptual scheme of disability (1965), and it describes the main pathway to disability and it includes risk, intra- and extra-individual factors that can buffer or exacerbate the disablement pathway. The main pathway describes the progression from pathology to impairments to functional limitation, and finally to disability. Pathology can be acute or chronic and it includes medically detected diseases, injuries, or developmental conditions. Impairments (e.g. pain, dyspnea) refer to dysfunction in specific body systems as a result of pathology. Functional limitations (e.g. physical function) are restrictions to perform basic physical and mental actions essential for daily

life. Functional limitations can evolve into disabilities, which refer to the inability to perform ADL.

Another valuable feature of the disablement model is its person-environment perspective. Disability is not considered strictly a personal matter, but rather a gap between the personal capability and the demand of the activity because the main pathway can be influenced by a variety of factors. Verbrugge and Jette (1994) expanded the original pathway to disability by introducing the concept of buffers and exacerbators that can modify the main pathway leading from pathology to disability. Risk factors are predisposing characteristics (e.g. demographic, behavioral, and environmental) that elevate the chances of developing impairment, functional limitation, and disability. Buffers or interventions target the reduction of the progression of the disability pathway. Intervention can result from personal efforts (intra-individual factors) or from others (extra-individual factors). Exacerbators are factors or actions that can increase disablement.

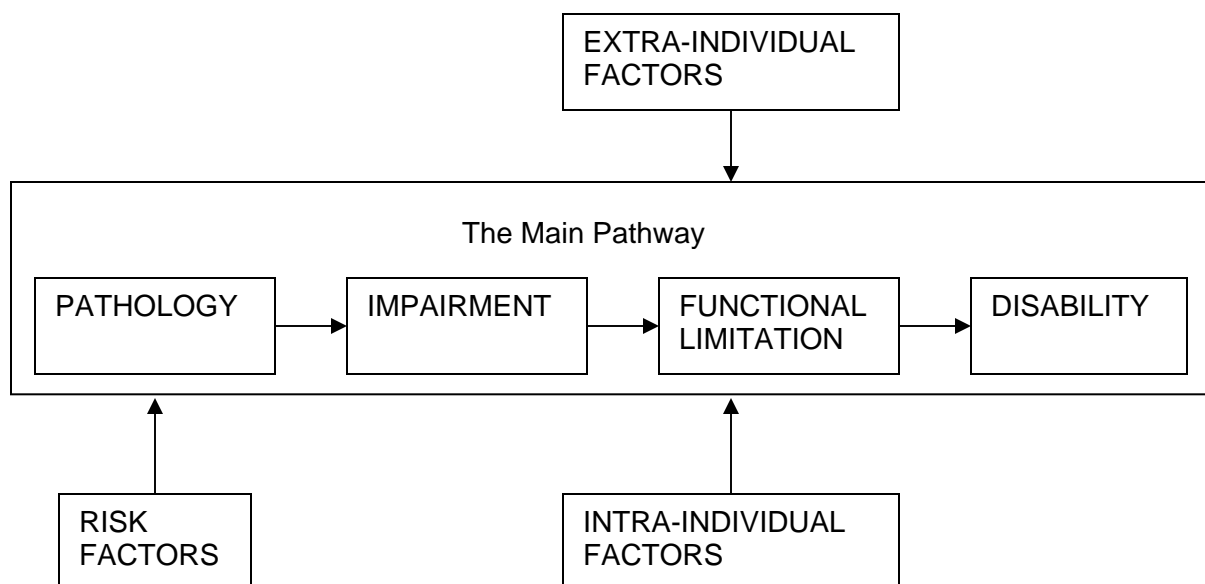


Fig 1. Adapted from Verbrugge and Jette (1994): The Disablement Process.

This Framework has been utilized to examine the pathway leading to disability among American Whites, Hispanics, and European participants (Femia et al., 2001; Lawrence & Jette, 1996; Peek, Patel, & Ottenbacher, 2005; Pérès et al., 2005). However, despite the high rates of disability among Blacks and people of lower socioeconomic status (SES), there is a lack of systematic research on the process of disability in these sub-groups of the older adult population. Moreover, studies utilizing a theoretical framework to understand the potential predictors of disability among Blacks and individuals of low SES are particularly scarce.

Predictors of Disability

Disability can cause loss of independence and has a negative impact on health-related quality of life. It also has financial implications for the family caregiver and society in general. Therefore, to design culturally appropriate strategies to prevent and manage disability and prolong independent life, it is fundamental to understand the factors that contribute to disability. Early recognition and treatment of pathologies, impairments, and functional limitations can reduce the risks of disability and its consequences such as dependency and utilization of costly health care services.

Based on the Nagi (1965) and Verbrugge and Jette (1994) models, it is clear that a pathological condition constitutes the first step in the process leading to functional limitations and disability. Jette (1996) compiled extensive research demonstrating the link between chronic diseases and subsequent disability in older adults. Functional ability tends to deteriorate with age as the number of chronic diseases increase, and some of the health conditions with greater impact on functional ability include stroke (Fried, Bandeen-Roche, Kasper, & Guralnick, 1999), heart disease (Schroll, Lovborg, Munck, Avlund, & Davidsen, 1997) respiratory disease (Fried et al., 1999), obesity (LaCroix, Guralnick, Berkman, Wallace, & Satterfield, 1993), diabetes (Fried et

al., 1999), depression (Femia, Zarit, & Johansson, 1997; Kivela & Pahkala, 2001), dementia (Agüero-Torres et al., 1998), and musculoskeletal diseases (Fried et al., 1999). Arthritis, for example, is a musculoskeletal condition that causes joint pain, swelling, and reduced ability to use the affected joint. Accordingly, arthritis consistently predicts functional disability throughout the aging literature (Issa & Sharma, 2006).

Functional Limitation

According to the Disablement Process, functional limitation is defined as restriction to perform basic physical and mental actions essential for daily life (Verbrugge & Jette, 1994), and it is the immediate predecessor to disability; consequently, functional ability should be an important predictor of ADL disability. Physical function can be described as the integration of physical performance, physiological capacity, and psychosocial factors and it is a similar, but separate concept from physical performance and physiological capacity (Cress et al, 1996).

Empirically, there are numerous instances in which functional limitations affect daily activities. Objective measures of lower-extremity function such as gait speed, standing balance, and time to rise from a chair are highly predictive of disability in previously non-disabled older persons (Guralnick, Ferrucci, Simonsick, Salive, & Wallace, 1995). These findings have been corroborated by further trials performed with various populations (Guralnik et al, 2000; Ostir, Markides, Black, & Goodwin, 1998).

Judge, Schechtman, and Cress (1996) performed a meta-analysis of data from older adults with various levels of functioning in six different study sites nation wide (Portland, New Haven, Seattle, Atlanta, Iowa, and Farmington), and they observed that a small decline in performance is associated with a higher prevalence of disability. Other measures of functional performance, such as the time to climb a flight of stairs and to walk four meters, indicate a preclinical

disability stage and they predict disability in the following 18 months (Fried, Bandeen-Roche, Chaves, & Johnson, 2000).

The effect of physical function on disability, regardless of other potential risk factors, has been investigated by Gill, Williams, Richardson, and Tinetti (1996). Their assessment of community-living older adults consisted of physical performance tests (e.g. chair stands), Katz instrument for self-reported ADL, and Mini Mental Status Examination (MMSE), and their results verified that physical performance contributes to the risk of disability regardless of cognitive performance. Further, when observing individuals with mild and moderate cognitive impairment (MMSE score 16 to 23 inclusive), the risk for assistance was elevated, but varied according to ability to perform functional tasks (Gill, Richardson, & Tinetti, 1995).

Measurement Aspects of Physical Function

For a better understanding of disability and its predictors, it is crucial to assess functional limitation and disability accurately; however, there is no one gold standard method for measuring these concepts. The traditional approach to evaluate physical function is with subjective tools. Self-report measures are widely utilized in both clinical and research settings because of their relatively low cost, simplicity to administer, lower time demand, and lower susceptibility to non-response (due to refusal or inability to perform the test). More recently, performance-based measures have been introduced to minimize potential limitations associated with self-report measures. Functional ability literature generally reveals a moderate relationship between subjective and objective measures of functional limitation and disability (Cress, 1995).

Discrepancy between self-reported and performance-based measures can be attributed to the following three key factors: (a) sensitivity of self-report measures, (b) internal and external interference, and (c) concepts being measured (Kempen, 1996). First, performance-based

measures are generally more sensitive to differences in time and aids used in the performance of ADL. For example, a slight decrement in function ability between two test dates may be detectable through a performance test, but may not be sufficiently detectable to the individual, thus not reflected in a subjective assessment. Second, self-report measures may be more susceptible to the influence of cognitive and affective functioning, personality traits, and sociodemographic characteristics. Finally, it is possible that performance-based and self-reported tests measure diverse concepts of the disablement pathway. For the most part, objective measures tend to assess more basic functional limitations, such as the ability to rise from a chair, or lift the arms above the head, whereas subjective measures generally concern disability more specifically (Guralnick et al., 1994).

Further, Mendes de Leon, Barnes, Bienias, Skarupski, and Evans (2005) demonstrated that because self-reported measures involve subjective judgment of functional ability, they are more susceptible to biases including expectation adjustments that can occur in one's perceived function as they age and experience diminished health (response shift). In studies utilizing racially diverse samples, the response shift can influence self-reported health-related outcomes because older Blacks tend to have a more negative perception of their own health than Whites (Ferraro, 1993).

Physical function can be measured by a number of performance tests such as the Senior Fitness Test (Rikli & Jones, 2001), the Physical Performance Test (Reuben & Siu, 1990), the Performance Oriented Mobility Assessment (Tinetti, & Ginter, 1988), or a combination of simple tests such as the timed up and go (TUG), functional reach (FR), and walk tests (Brooks, Davis, & Naglie, 2006). A more inclusive objective test of physical function is the Continuous Scale Physical Functional Performance Test (CS-PFP; Cress et al., 1996). This test consists of a

standardized series of low (personal), moderate (household), and heavy (mobility) tasks that mimic activities essential for independent living. The CS-PFP10 (Cress, Patrella, Moore, & Schenkman, 2005) is a reduced form of this comprehensive test of physical function. This physical function test has minimized ceiling effects, which makes it appropriate for use with samples including highly functioning individuals. Conversely, the CS-PFP10 accommodates individuals of low function by continuous scaling the scores in a scale from 0 to 100, thus lowering floor effects. The upper and lower performance limits for each task were established empirically and the process of scaling the scores is based on the following formula:

Observed score = (observed score – lower limit) / (upper limit – lower limit) x 100 (Cress, 1997)

Another advantage of this measure is that it takes into consideration the cardiorespiratory and neuromuscular system, and the integration of different body systems, whereas most other physical function tests used with the older population focus on one aspect of function such as strength (sit-to-stand and/or biceps curl), cardiovascular endurance (step test), and balance (tanden stand/walk)

Consistent with previous findings that indicate that subjective tools actually measure disability rather than functional limitation (Guaralnick et al., 1994; Kempen, 1996), disability should be assessed with self-report instruments such as the Functional Status Index (FSI; Jette, 1980). The FSI is a self-report tool to assess functional disability, as well as the degree of pain and difficulty in performing functional activities that are classified in five categories (mobility, personal care, hand activities, home chores, and social activities). The advantages of this tool is that it can be used to assess a wide range of activities that are important for independent living, including more complex IADL and social/role activities. Finally, inquiry about assistance rather

than difficulty is generally a better marker of loss of independence and potential consumption of health care services.

Impairments

Based on the disablement process, impairments affect disability indirectly through functional limitation. Among the older adult population, pain and dyspnea are prevalent impairments that are generally associated with the musculoskeletal and cardiorespiratory systems.

Pain

Pain is an important topic in gerontological research because it can pose a problem in the older adult's daily life. The prevalence of pain in the older population is high; reaching 80% to 85% of persons 65 and older (Ross & Crook, 1998). Pain that interferes with daily life, including work outside the home and homework, increases with age (Thomas, Peat, Harris, Wilkie, & Croft, 2004), contributing to lowered physical functioning and increased chance of disability (Mossey, Gallagher, & Tirumalasetti, 2000).

Musculoskeletal diseases are common sources of pain among older adults. This type of health condition generally elicits pain in the joints and muscles (Gibson & Helme, 2001), whereas other chronic health problems such as cardiovascular disease can cause chest pain (angina). Chronic conditions such as arthritis and rheumatism are prevalent among older adults, and they are significantly associated with difficulty in ADL, even after controlling for potential demographic and medical confounders (March et al., 1998). Further, the pain and joint limitations associated with arthritis are regarded as strong predictors of disability (Hughes, Dunlop, Edelman, Chang, & Singer, 1994).

Scudds and Robertson (1998) analyzed the relation between physical disability and musculoskeletal pain in older adults, and they observed that those who reported musculoskeletal

pain were seven times more likely to have some difficulty performing activities. Moreover, the likelihood of experiencing difficulties with activities remained high after controlling for confounding variables.

These findings corroborate the notion that pain impacts disability in older adults. Further examination of this topic including a more diverse sample of older persons can shed light on the importance of assessing and managing pain for maintaining independent life in older adults at risk for disability.

Dyspnea

Numerous acute and chronic diseases, particularly conditions affecting the cardiorespiratory system, can affect the performance of daily activities because of the sensation of breathlessness also known as dyspnea (Ho et al., 2001). A more elaborate definition of dyspnea is a feeling of difficult or labored breathing inappropriate to the level of effort produced (Wright & Branscomb, 1954). Dyspnea originates from a discrepancy between afferent and efferent information in the respiratory system (American Thoracic Society, 1999). Cardiorespiratory conditions can cause dyspnea, not only as a result of normal physiological changes associated with the disease, but also because of the physical deconditioning that generally accompanies the health problem. In deconditioned individuals, physical exertion is associated with a rapid rise in blood lactate levels (Sue, Wasserman, Moricca, & Casaburi, 1988), which in turn increases the ventilation, thus exacerbating the sensation of breathlessness (Casaburi et al., 1991).

Accordingly, one of the most frequent complaints of patients with chronic obstructive pulmonary disease (COPD) is exertional dyspnea (Oga, Nishimura, Tsukino, Hajiro, Mishima, 2005), which is the sensation of breathlessness elicited by physical exertion. The severity of exertional dyspnea can be estimated based on the intensity of physical activity triggering the

symptoms, with breathlessness provoked by higher levels of exertion being less severe than breathlessness elicited by low exertion activity.

Bestall and colleagues (1999) observed the prevalence of dyspnea to be as high as 62% among people over 65 years old. They also detected an association between dyspnea and disability in this population. Their findings reveal that as the degree of breathlessness intensifies, the ability to perform ADL decreases significantly. Further, in patients with advanced lung cancer, dyspnea interferes with physical, as well as psychological activities (Tanaka, Akeschi, Okuyama, Nishiwaki, & Uchitomi, 2002).

In the context of the disablement model, both pain and dyspnea represent impairments; therefore, they should impact disability through functional limitations.

Consequences of Disability

The results of disability affect not only the older adults themselves, but also their families and society in general because of the need for assistance in daily activities and health care costs (Avlund, 2004; Rice & LaPlante, 1992). Disability can escalate into loss of independence (Ostir et al., 1999), and increased risk for falls (Fried & Guralnik, 1997). Data from the National Nursing Home Survey and the National Health Interview Survey illustrate the role disability level plays in the type of health care received by community-dwelling persons. Individuals who have IADL disabilities only, or who have one to four ADL disabilities rely primarily on informal community care, and to a lesser extent on formal community care. Although in absolute numbers individuals with three and four ADL disabilities rely mainly on community care, the proportion of institutionalization is already greater than for individuals with less than three ADL disabilities. As the number of ADL disabilities exceeds four, the reliance on nursing home care increases considerably (Hing & Bloom, 1990).

Moreover, disability can inflate the risk for onset, complication, and severity of other diseases (Corti, Salive, & Guralnik, 1996). Corti and colleagues (1996) observed that older adults with disabilities have twice as great a risk for coronary heart disease independent of other coronary risk factors. This may be the result of inactivity caused by the physical disability, which can precipitate a cardiac event (Corti et al., 1996).

Community-living older adults who suffer from disability generally require extensive formal and/or informal care. Disability may result in institutionalization, and ultimately reduced life expectancy of these previously independent older adults (Donaldson, 1980; Guralnik, 1994; Guralnik, Fried, & Salive, 1996). Further negative outcomes from disability include lowered quality of life (Wilson & Cleary, 1995), depression (Cole & Dendukuri, 2003; Gurland, Wilder, & Berkman, 1988; Yang & George, 2005), and poor health perception (Hoeymans, Feskens, Kromwout, & van den Bos, 1997; Partridge, Johnston, & Morris, 1996). For instance, Hoeymans and colleagues (1997) assessed self-rated health, disability in activities of daily living (self-reported), and functional limitations (performance tests) in non-institutionalized older males and observed that self-reported disabilities explained 7-14% of the variance in self-rated health. Yang and George (2005) demonstrated a strong relationship between the onset of disability and an increase in depressive symptoms. In addition, they noticed that both disability status and disability transitions amplified depression in older adults.

Restriction of physical activity resulting from disability is another detrimental effect of disability that can elicit its own negative consequences, including further disability (Gill, Allore, & Guo, 2003), thus generating a vicious cycle. Persons with disabilities, including older adults, are less likely to engage in structured exercise and physical activity (Boslaugh & Andresen,

2006), and this lack of physical activity can cause further deterioration of physical function necessary for independent living (Gill et al., 2003).

Disability Prevention

Preventive policies are generally classified into primary (before the onset of targeted condition), secondary (at the onset), and tertiary (symptoms management). Primary prevention targets factors leading to the development of the health condition include antecedents and risk factors, which in the present case of disability include functional limitations and impairments. Strategies to maintain physical function and avert pain and dyspnea are some examples of primary prevention of disability. Further ways to prevent disability at the primary level are avoiding chronic diseases and lifestyle characteristics that lead to impairments and functional limitations. For instance, preventing risk factors of chronic diseases can reduce the incidence of these diseases and consequently associated disability (Barberger-Gateau, Tessier, & Nejjari, 1997). Physical activity is an efficient approach to disability prevention as it impacts pathology, impairment, and functional limitation (American College of Sports Medicine Position Stand: Exercise and Physical Activity in Older Adults; Frankel, Bean, & Frontera, 2006; Gill, Allore, & Guo, 2003; Hardy & Gill, 2005; Miller, Rejesky, Reboussin, Ten Have, & Ettinger, 2000).

Secondary prevention consists of early detection of pathology, impairments, and functional limitations, and prevention of progression to disability and symptoms (e.g. need for assistance). Preventive strategies at the secondary level include education, modification of risk factors, and treatment of pathologies. The role of physical activity for secondary prevention is less apparent. Carlson and associates (1999) noticed that studies about the role of physical activity on secondary prevention of disability are either limited (aerobic and balance training) or yield contradictory results (strength training). However, there seems to be a tendency of beneficial

effects of physical activity on numerous health conditions such as obesity, hypertension, osteoporosis, and balance problems (Carlson et al., 1999).

The goal of tertiary prevention is to minimize the negative effects of disability that are already present. Managing symptoms and minimizing the negative effects of disability on independent life are the main goals at this point. Treating the pathology and impairments, and restoring physical function can accomplish this. Treatment of pathology and impairments is typically based on medications such as anti-ischemic drugs and vasodilators for cardiovascular diseases, bronchodilators for pulmonary diseases, and nonsteroidal anti-inflammatory drugs (NSAID) for arthritis (Durstine & Moore, 2003). Maintaining and restoring physical function can be accomplished through medications or therapy and exercise (Durstine & Moore, 2003).

From a policy standpoint, it is crucial to identify cross-cultural characteristics of disability with the purpose of designing appropriate prevention strategies for different cultural groups, especially those at higher risk of becoming disabled such as Blacks and individuals of low socioeconomic status (SES) (He et al., 2005). Based on information from longitudinal studies that have demonstrated a strong association between insufficient exercise and the onset of disability (Avlund, 2004), physical activity and exercise should be promoted as a relatively simple and inexpensive solution applicable during primary, secondary, and tertiary prevention of disability.

Purpose of Present Study and Hypothesis

A variety of medical, demographic, social, psychological, and behavioral factors act together to predict ADL impairments. Yeh, Chen, Liao & Liao (2004) demonstrated that in patients with pulmonary disease, functional performance is influenced by age, disease severity, dyspnea, fatigue and exercise tolerance, and psychological factors such as health perception and negative

moods. However, most of the findings about predictors of disability are based on studies of Whites (Femia et al., 2001; Lawrence & Jette, 1996; Pérès, Verret, Alioum & Barberger-Gateau, 2005). Despite the high rates of disability among Blacks and people of lower SES, there is a lack of systematic research on the process of disability among culturally diverse persons (i.e., diverse according to race, education, income). Therefore, the purpose of this study was to examine the contribution of physical function, pain, and dyspnea to ADL disability (i.e., defined as a need for assistance) in culturally diverse older adults. For the purposes of this study, cultural diversity refers not only to race, but also to a variety of income and education levels. We hypothesized that physical function, pain, and dyspnea would predict ADL disability in culturally diverse older adults. We hypothesized that functional limitation (physical function) would be a stronger predictor of disability than the impairments (pain and dyspnea; Verbrugge & Jette, 1994).

METHODS

The procedures described herein were approved by the institutional review board of the Louisiana State University (see appendix A).

Participants

Eighty-three culturally diverse, independent-living older adults were recruited to participate in a larger physical activity and nutrition intervention study (see Ellis et al., 2006 for more detail) through informational meetings and flyers at an urban community center and at an independent living housing facility for seniors with fixed incomes. The older adults interested in the study were contacted by phone or face-to-face meetings at the centers to schedule an initial interview. Inclusion criteria for the intervention study were apparently healthy older adults: (a) who were at least 50 years of age; (b) who were involved in activities at an urban community center or resided at an independent living housing facility for seniors with fixed incomes; (c) who consented to participate in the intervention study (see appendix B). Exclusion criteria for the intervention study were any older adults in the American Heart Association Classes C and D.

Instruments

Personal History Questionnaire

A personal history questionnaire was created for the intervention study to obtain information regarding participants' age, sex, marital status, education level, annual income, race, and employment status (see appendix C).

Health Status Questionnaire (HSQ)

The health status questionnaire (Howley & Franks, 2003) is a 25-item questionnaire that assesses participants' medical history (i.e., examinations, operations, medical conditions, medications), health-related behavior (i.e., smoking, exercise, weight), and health-related

attitudes (see appendix D). Except for their heart disease classification, the participants' health status was not grounds for exclusion from this study, but information about prescription medications and medical conditions were used for descriptive purposes.

Mini-Mental Status Examination (MMSE)

The MMSE (Folstein, Folstein, & McHugh, 1975) is a screening measure of cognitive status commonly administered to older adults by physicians and researchers (see appendix E). The MMSE is comprised of 11 questions that assess orientation to time and place, registration, attention and calculation, recall, naming, repetition, comprehension, reading, writing, and drawing. Scores range from 0 to 30 with lower scores indicating greater cognitive impairment. Classifications of cognitive status are recommended to be: (a) normal cognitive function = 27-30, (b) mild cognitive impairment = 21-26, (c) moderate cognitive impairment = 11-20, and (d) severe cognitive impairment = 0-10 (Folstein, Folstein, McHugh, & Fanjiang, 2001).

Test-retest reliability (scores about .80; Anthony, LeResche, Niaz, von Korff, & Folstein, 1982) and inter-rater reliability (Range .83 to .95; Dick et al., 1984; Folstein et al., 1975; Kafonek et al., 1989; Molloy, Alemayehu, & Roberts, 1991) of the MMSE are adequate. However, internal consistency (α) among community participants is between .31 to .77 (Holzer, Tischler, Leaf, & Myers, 1984; Hopp, Dixon, Grut, & Bäckman, 1997; Jorm, Scott, Henderson, & Kay, 1988; Kay et al., 1985; Tombaugh, McDowell, Kristjansson, & Hubley, 1996), which although in some instances is lower than what is generally viewed as acceptable, the authors contend that this may be because the items were designed to assess a variety of cognitive functions (Folstein et al., 2001). Furthermore, the MMSE has adequate content, predictive, and convergent validity (Tombaugh & McIntyre, 1992). In the present study the MMSE was used for descriptive purposes.

Functional Status Index (FSI)

The FSI (Jette, 1980) provides a continuous scale measure of self-reported need for assistance (FSIA), amount of pain (FSIP), and degree of difficulty (FSID) with the performance of basic and instrumental ADL (see appendix F). The FSI contains 18 items including the domains of mobility, personal care, home chores, hand activities, and social activities. Items are scored in the following three areas: FSIA (no assistance = 1; uses device = 2; human assistance = 3; device and human assistance = 4; cannot safely perform activity = 5); FSIP (no pain = 1; mild pain = 2; moderate pain = 3; severe pain = 4); and FSID (no difficulty = 1; mild difficulty = 2; moderate difficulty = 3; severe difficulty = 4). The scores range from 18 to 90 (FSIA) and 18 to 72 (FSIP and FSID) with higher scores indicating greater limitation.

The construct and criterion validity of the FSI has been established against objective measures of physical function (Jette, 1980, 1987), and the test-retest reliability coefficients of the various test items are reported as being in the range of $r = .64$ to $.82$ (Jette, 1980, 1987). The FSIA ($\alpha = .69$) was used in the analyses as the outcome measure of disability and the FSIP ($\alpha = .77$) was used as a measure of pain.

Continuous Scale-Physical Functional Performance 10-Item Test (CS-PFP10)

The CS-PFP10 (Cress, Patrella, Moore, & Schenkman, 2005), which is a reduced version of the Continuous-Scale Physical Functional Performance Test (CS-PFP; Cress et al., 1996), was used to assess performance-based physical function. The CS-PFP10 requires the participant to perform a series of ADL based activities in a standard fashion. Participants are given specific directions for each task and they are instructed to perform each task safely, but to work at maximal effort. The time taken to complete the tasks, distance covered, and/or weight carried are recorded and converted to a set of continuous-scale scores. The test battery provides scores in the

following five physical domains: upper body strength, lower body strength, upper body flexibility, balance and coordination, endurance, and a total CS-PFP score (Cress et al., 1996). Scores on each of the five physical domains and for the total CS-PFP ranges from 0 to 100, with higher scores representing better function. The CS-PFP10 total score was used in the analyses as a measure of physical function.

The test has been validated for use in older populations (Cress et al., 1996), and the reproducibility of the CS-PFP10 scores and subscales are very good, with intraclass correlation coefficients in the range of $r = 0.79$ to 0.94 . For more information regarding the administration of the CS-PFP10 please see Cress et al. (1996, 2005) or the World Wide Web at http://www.coe.uga.edu/cs-pfp/cspfp_test.html.

Visual Analog Dyspnea Scale

Dyspnea was assessed using a visual analog scale (VAS). Dyspnea is a common symptom of various acute or chronic illnesses, and dyspnea scales are used to quantify the sense of effort to breathe in patients with numerous disorders (Barberger-Gateau, Tessier & Nejari, 1997). The VAS is a 10 cm horizontal line anchored by “none at all” and “extreme shortness of breath” on each end. Immediately upon completion of the CS-PFP10 participants were instructed to indicate their degree of breathlessness by marking along the line. Dyspnea was then expressed as a percent of the full VAS line length.

VAS has adequate reproducibility, with a coefficient of variation for the maximal scores of $6 \pm 1\%$, which is similar to the variation in maximal Borg score ($3 \pm 1\%$). VAS is highly correlated with minute ventilation ($r = .98$) and the Borg scale ($r = .99$) in individuals with stable chronic obstructive pulmonary disease (Muza, Silverman, Gilmore, Hellerstein, & Kelsen, 1990).

Procedures

Measures were collected during two 60-min testing sessions that were part of five pre-tests conducted between February 2004 and February 2006 for the physical activity and nutrition intervention. The first testing session was a face-to-face interview in which participants from the local community center were interviewed at the community center and residents of the independent living housing facility were interviewed at their residence. During the interview, participants completed an informed consent document approved by the University's Institutional Review Board and then they responded to the personal history questionnaire, the health status questionnaire, and the MMSE. The FSI, CS-PFP10, and dyspnea scale were administered during a second testing session that was conducted at the local community center. Participants from the independent living housing facility were provided transportation to the testing locale.

Statistical Analyses

Before conducting the analyses, tests of normality and univariate and multivariate outliers were performed. Descriptive statistics (frequencies, means, and standard deviations) were used to determine the sample characteristics. Pearson correlation was conducted to determine associations between the independent and dependent variables. Finally, to analyze the hypothesis, hierarchical regression analyses with forced entry within each block were conducted to test the predictors of disability. The order and content of the blocks of predictors were based on the theoretical model (Verbrugge & Jette, 1994). In the first model, disability (FSIA) was regressed on physical function (CS-PFP10 total score; Block 1) and dyspnea and pain (FSIP; Block 2). In the second model, physical function (CS-PFP10 total score) was regressed on dyspnea and pain (FSIP).

RESULTS

Eighty-three men and women 50 years of age and older consented to participate in a physical activity and nutrition intervention study (Ellis et al., 2006). Twenty-six of these participants were missing data for this investigation. Incomplete data resulted in cases of: (a) participant relocation ($n = 5$), (b) voluntary withdrawal from the study for health ($n = 2$) or unidentified ($n = 6$) reasons, (c) participant's inability to complete one of the tests because of physical or visual impairment ($n = 3$), and (d) failure to collect one of the measures ($n = 10$).

Out of the 57 participants with complete data sets, six were univariate and multivariate outliers and were excluded from the analyses. The final sample included 51 culturally diverse older adults ($n = 33$ from the urban community and $n = 18$ from the independent living housing facility for seniors with fixed incomes). Participants were between the ages of 50 and 93 (M age = 68.5 years, $SD = 9.8$), and had an average cognitive status of 24.8 ($SD = 3.7$, Range = 15.0-30.0; see Table 1). About two thirds (78.4%) of the participants were female, 76.5% were Black ($n = 1$ did not know race), approximately half (51.0%) had less than or equal to a high school education, 35.3% reported an annual income of less than or equal to \$10,000 ($n = 4$ did not report or did not know income level), 76.5% were not married (i.e., single, divorced, widowed, living with partner), and 74.5% were not working (i.e., retired, unemployed). The most prevalent chronic medical conditions were cardiorespiratory (82.1%; e.g., asthma, emphysema, heart problems, high blood pressure, stroke), followed by orthopedic conditions (37.3 %; e.g., arthritis, back or neck problems), "other" health conditions (37.3%; e.g., cancer, diabetes), and neurological conditions (35.5%; e.g., eye or hearing problems).

Table 1. Sample Characteristics

	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
Age	50	93	68.46	9.75	0.42	-0.25
FSIA	18	41	21.65	4.74	1.85	4.38
CS-PFP10	17.80	83.93	54.18	15.70	-0.01	-0.59
Dyspnea	0.00	1.00	0.30	0.24	0.81	0.13
FSIP	18	31	19.55	2.95	2.6	6.7
No. of Meds	0.00	9.00	2.86	2.10	1.18	2.05
MMSE	15	30	24.76	3.68	-0.66	-0.31

Note. FSIA = functional status index-need for assistance; CS-PFP10 = Continuous Scale Physical Functional Performance 10-item Test; FSIP = functional status index-pain; No. of Meds = number of self-reported prescription medications; MMSE = Mini Mental Status Examination.

MANOVA was used to examine differences on FSIA, CS-PFP10 total score, FSIP, dyspnea, and MMSE between the older adults from the two facilities. Significant group differences were observed based on facility, Wilks' Lambda = .77, $F(5, 45) = 2.74$, $p < .05$, $\eta^2 = .23$. Univariate analyses revealed that the groups were significantly different on the FSIA and CS-PFP10 total score with the group from the independent living housing facility reporting a greater need for assistance ($p < .05$) and performing worse on the CS-PFP10 (see Table 2). Because of the group differences for facility, Cronbach's alphas were recalculated, and correlations and regressions were run separately for each group.

MANOVA was also calculated to determine if differences occurred on the FSIA, CS-PFP10 total score, FSIP, and dyspnea based on MMSE scores (scores ≥ 27 vs. scores < 26). No group differences were observed for cognitive status ($p = .71$; see Table 3).

Table 2. Mean and Standard Deviations for the Two Facilities

	Community Center		Housing Facility		
	Mean	SD	Mean	SD	<i>p</i>
FSIA	20.36*	0.78	24.00*	1.06	0.008
CS-PFP10	59.12*	2.49	45.15*	3.37	0.002
Dyspnea	0.29	0.04	0.32	0.06	0.750
FSIP	19.03	0.50	20.50	0.68	0.089

Note. * $p < .05$, FSIA = functional status index-need for assistance; CS-PFP10 = Continuous Scale Physical Functional Performance 10-item Test; FSIP = functional status index-pain.

Table 3. Mean and Standard Deviations Based on Cognitive Status

	Normal (27-30)		Mild-Moderate Impairment (15-26)		
	Mean	SD	Mean	SD	<i>p</i>
FSIA	21.25	1.08	21.90	0.87	0.639
CS-PFP10	57.20	3.50	52.25	2.81	0.275
Dyspnea	0.29	0.05	0.31	0.04	0.806
FSIP	19.85	0.66	19.36	0.53	0.563

Note. FSIA = functional status index-need for assistance; CS-PFP10 = Continuous Scale Physical Functional Performance 10-item Test; FSIP = functional status index-pain.

Internal reliabilities (Cronbach's alpha) were recalculated for the FSIA and the FSIP subscales according to the facilities from which the participants were recruited. For the group from the urban community center, the alphas were .58 and .82 for the FSIA and FSIP, respectively. For the group from the housing facility, the alphas were .72 and .71 for the FSIA and FSIP, respectively.

Significant associations were observed among the disablement process constructs for the groups at the urban community center and the housing facility (see Table 4). With respect to the

participants recruited at the community center, the strongest association was between the FSIA and CS-PFP-10. Among the housing facility participants the strongest association was between FSIA and FSIP.

Table 4. Correlation among the Constructs of the Disablement Process Model

	Community Center				Housing Facility			
	FSIA	CS-PFP10	Dyspnea	Pain	FSIA	CS-PFP10	Dyspnea	Pain
FSIA	-	-.46**	.37*	.38*	-	-.54*	.20	.66**
CS-PFP10		-	-.24	-.06		-	-.48*	-.39
Dyspnea			-	.33			-	.20
FSIP				-				—

Note. * = $p < .05$; ** = $p < .01$, FSIA = functional status index-need for assistance; CS-PFP10 = Continuous Scale Physical Functional Performance 10-item Test; FSIP = functional status index-pain.

For the participants from the urban community center, the first hierarchical regression model revealed that physical function (CS-PFP10 total score), pain (FSIP), and dyspnea explained 36.2% of the variance in disability (FSIA), but physical function was the only significant predictor ($p < .05$; see Table 5). In the second model, pain (FSIP) and dyspnea explained 5.9% of the variance in physical function (CS-PFP10 total score) and neither were significant predictors (see table 6).

For the participants from the housing facility, physical function (CS-PFP10 total score), pain (FSIP), and dyspnea accounted for 53.3% of the variance in disability (FSIA), and pain was the only significant predictor ($p < .05$; see table 7). In the second model, pain and dyspnea accounted for 32.6% of the variance in physical function (CS-PFP10 total score), but neither were significant predictors (see table 8).

Table 5. Hierarchical Regression Analysis for FSIA: Urban Community Center

	R^2	F	$F \Delta$	p	β
Block 1	.21	8.26		.01	
CS-PFP10				.01	-.46
Block 2	.36		3.46	.05	
CS-PFP10				.02	-.40
Dyspnea				.27	.18
FSIP				.07	.30

Note. FSIA = functional status index-need for assistance; CS-PFP10 = Continuous Scale Physical Functional Performance 10-item Test; FSIP = functional status index-pain.

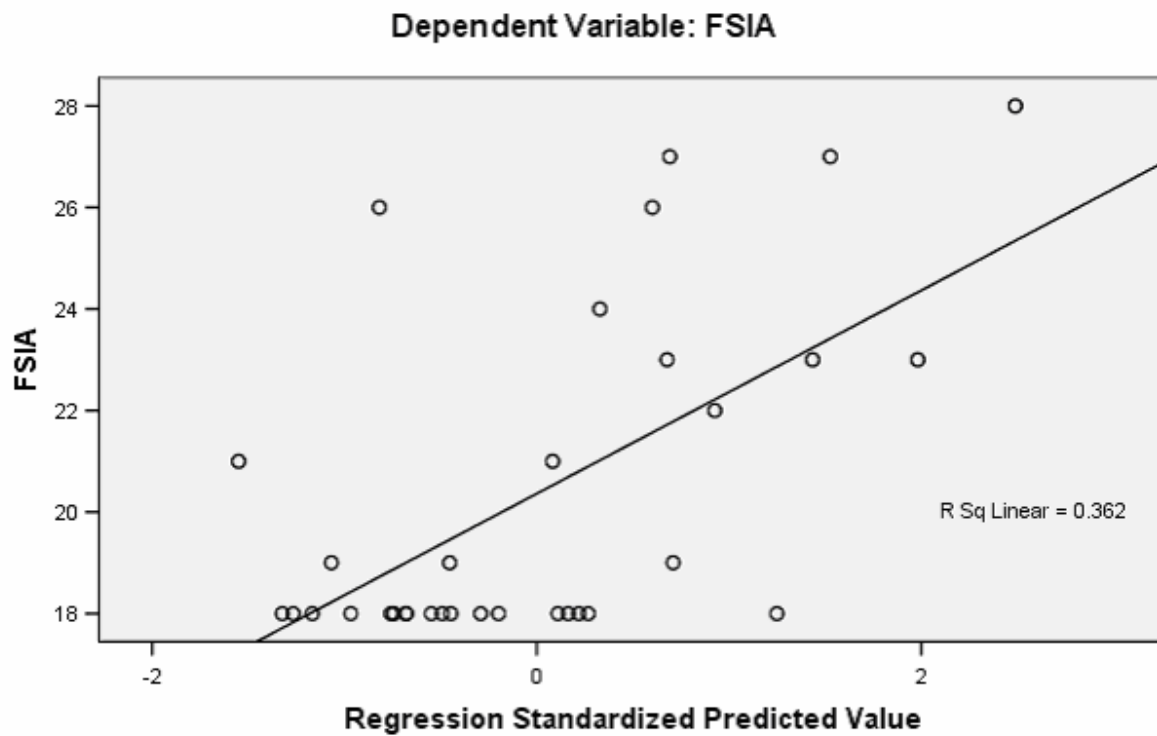


Figure 2. Hierarchical Regression Analysis for FSIA: Urban Community Center

Table 6. Regression Analysis for CS-PFP10: Urban Community Center

	R^2	F	$F \Delta$	p	β
Block 1	.06	0.95		.40	
Dyspnea				.19	-.25
FSIP				.93	.02

Note. FSIA = functional status index-need for assistance; CS-PFP10 = Continuous Scale Physical Functional Performance 10-item Test; FSIP = functional status index-pain.

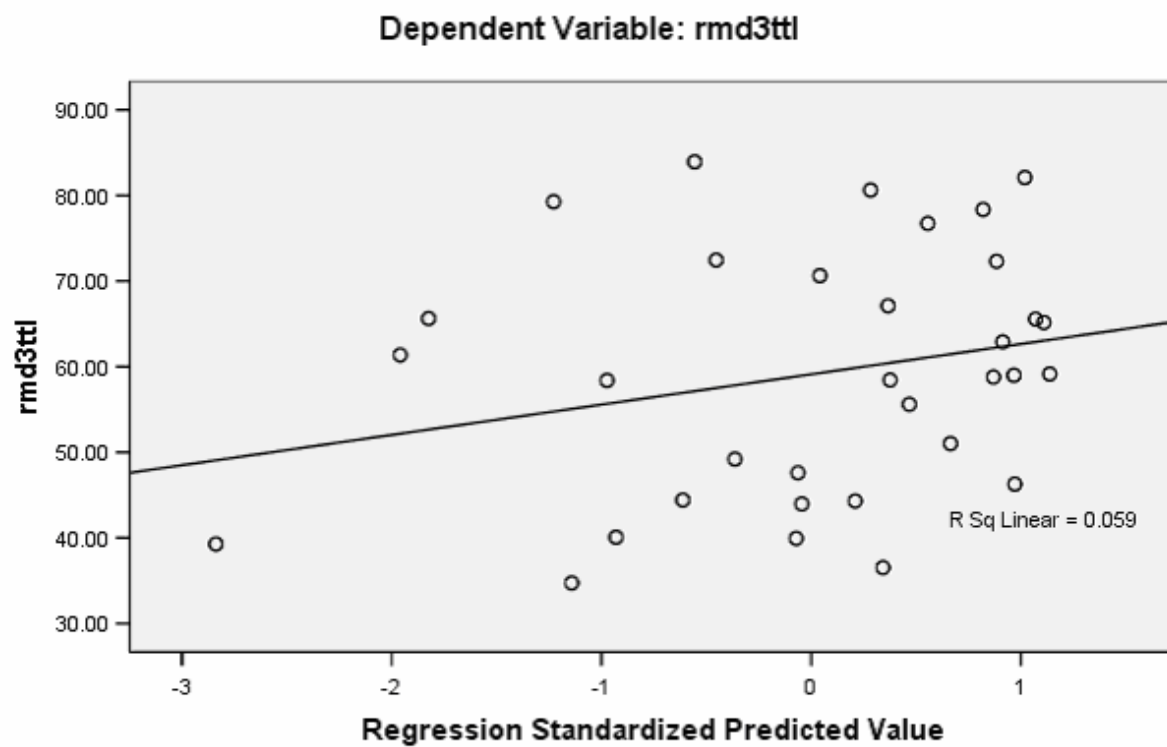


Figure 3. Regression Analysis for CS-PFP10: Urban Community Center

Table 7. Hierarchical Regression Analysis for FSIA: Housing Facility

	R^2	F	$F \Delta$	p	β
Block 1	.30	6.74		.02	
CS-PFP10				.02	-.54
Block 2	.53		3.55	.01	
CS-PFP10				.11	-.38
Dyspnea				.67	-.09
FSIP				.02	.52

Note. FSIA = functional status index-need for assistance; CS-PFP10 = Continuous Scale Physical Functional Performance 10-item Test; FSIP = functional status index-pain.

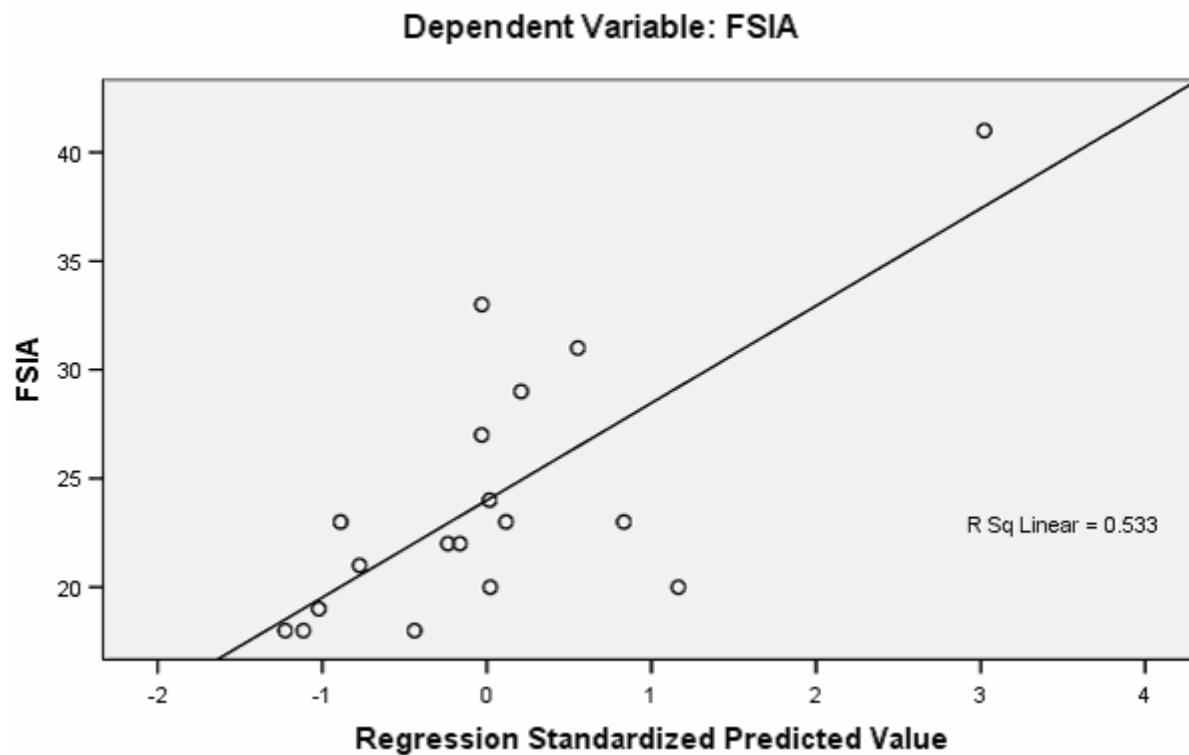


Figure 4. Hierarchical Regression Analysis for FSIA: Housing Facility

Table 8. Regression Analysis for CS-PFP10: Housing Facility

	R^2	F	$F \Delta$	p	β
Block 1	.33	3.62		.05	
Dyspnea				.07	-.42
FSIP				.18	-.31

Note. FSIA = functional status index-need for assistance; CS-PFP10 = Continuous Scale Physical Functional Performance 10-item Test; FSIP = functional status index-pain.

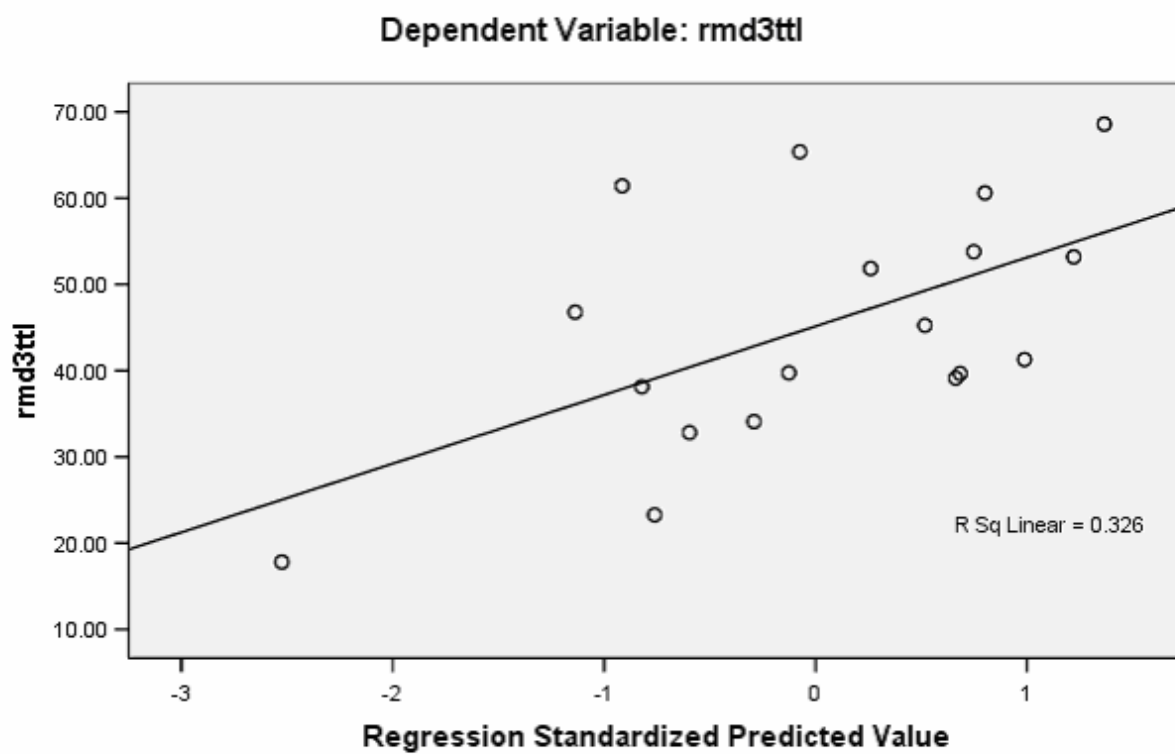


Figure 5. Regression Analysis for CS-PFP10: Housing Facility

DISCUSSION

As life expectancy increases, optimizing the ability to perform ADL becomes increasingly important to a growing number of older adults who wish to live an active, independent life. Therefore, the primary purpose of this study was to investigate the contribution of physical function, dyspnea, and pain to ADL disability in a sample of culturally diverse community-living older adults.

The findings of this study provide support to the premise that functional limitations and impairments predict disability in ADL in a sample of culturally diverse older adults. Consistent with the disablement model, functional limitation explains a greater portion of the variance in disability than pain and dyspnea, thus providing evidence of the value of using the disablement model constructs to study disability in culturally diverse older adults.

Our study sample included 51 older adults between the ages of 50 and 93 (M age = 60.0 years, $SD = 9.7$; 78.4% female, 76.5% Black, 51.0% \leq high school, 35.3% \leq \$10,000 per year). In comparison to the general population as reported by the U.S. Census Bureau (2002, 2004), our sample included a higher percentage of Blacks (national average \approx 12.3%), females, individuals of lower income, and a similar percentage of participants with lower education level.

Previous studies have examined the disablement process model in some detail; however, none of them tested this model with culturally diverse population. Lawrence and Jette (1996) tested the disablement process model on a sample of individuals 55 and older and virtually all White (93.6%). About two-thirds of their sample was female and the mean level of education was 11.2 years. Femia, Zarit, and Johansson (2001) utilized the conceptual model of the disablement process to investigate the disability experience among the oldest old in Sweden. Their sample population was 66.3% female and about 80% had education equivalent to

elementary in the United States. They did not report race or income. Reynolds and Silverstein (2003) investigated the role of various factors in the onset of disability using the disablement process as a guide. On average their participants had 3.3 types of assets (on a 0-8 scale), 63.1% were female, and only 6.7% were non-Hispanic Blacks. Pérès, Verret, Alioum, and Berberger-Gatau (2005) explored the disablement process model in French older adults. Although they did not report race or income, 66.2% of their participants were “highly educated”, 57.3% were female, and the most frequent medical conditions were cardiovascular problems (80.7%) and cognitive impairment (29.6%). Although these studies demonstrated the utility of the disablement process model, the demographic characteristics of our sample population justify our purpose of examining the contribution of physical function, pain, and dyspnea to ADL disability in a more culturally diverse sample of older adults.

Considering that the participants from the community center and the housing facility had significantly different FSIA and CS-PFP10 scores they were analyzed separately. Among the participants from the community center, disability was significantly associated with physical function, dyspnea, and pain. The strongest and most significant relationship was between FSIA and CS-PFP10, supporting the main pathway of the disablement model. The negative correlation between these two constructs indicates participants with higher degree of function reported less disability (i.e., need for assistance). With respect to dyspnea and pain, the positive associations between these impairments and disability indicate that greater dyspnea and greater pain are associated with greater reported need for assistance. This finding is consistent with previous reports (Bestall et al., 1999; Monsó et al., 1998; Scudds & Robertson, 1998; Tanaka et al., 2002).

Hierarchical regression revealed that physical function predicts 21% of self-reported disability in the community center participants, and when dyspnea and pain were added to the

model, they explained an additional 15% of the variance in disability; however only physical function was a significant predictor, and it remained significant after the addition of the other predictors. These findings are consistent with the disablement process model as functional limitation (CS-PFP10) precedes disability immediately, thus explaining most of the variance in disability. Impairments such as dyspnea and pain can also predict disability, but generally this prediction is indirect, through functional limitations. However, when CS-PFP10 was regressed on FSIP and dyspnea, there was no significant variance in function explained by these two impairments, which contradicts the disablement model. Thus, one could hypothesize that the influence of pain and dyspnea on disability (FSIA) are not the result of a common influence on functional limitation. This appears to be especially true for pain, considering that there was a trend toward significance when disability was regressed to pain (see Table 5).

There were significant associations between the outcome measure, physical function, and pain among the participants from the housing facility; however, disability was not correlated to dyspnea. Based on the results of the hierarchical multiple regressions, physical function predicted 30% of self-report disability, and when dyspnea and pain are added they explained 53% of the variance in FSIA. Physical function and pain were significant predictors, and only pain was a significant predictor when all variables were entered in the regression model.

Interestingly, this finding further corroborates the idea that pain may predict disability independent of physical function. To substantiate these findings, when physical function was regressed on dyspnea and pain, they predicted about 33% of physical function, but pain was not a significant predictor (see table 8). This result suggests that when analyzing the disablement model with this population, pain should be part of the functional limitation construct rather than impairment. One possible explanation for classifying pain as a functional limitation is that it

restricts the functional ability of the individual as he opts to perform at a level lower than physically possible during daily activities to avoid the pain. Additionally, if the pain is widespread, it better fits the construct of functional limitation rather than impairment as it limits performance at the level of the whole organism. Considering that the instrument utilized in the present study does not differentiate between localized and whole body pain, the information necessary to relocate pain in the model is not available. However, these findings suggest that the experiences of pain, and the type of pain, are important points to be considered by future researchers using the disablement process model.

On the basis of these findings and previous work demonstrating the impact of physical function and impairments on disability, it appears that treating functional limitations, dyspnea, and pain among culturally diverse older adults could reduce the risk of ADL disability. Consequently, these results draw important practical implications by revealing physical function, pain and dyspnea as potential targets for intervention. Circulatory and respiratory diseases are the main causes of dyspnea, whereas arthritis is a major source of pain in older adults. Therefore, preventing these health conditions, whether pharmacologically or through exercise, should be a main strategy to overcome the challenge of expanding healthy life expectancy.

One limitation of this study was its small sample size. As a result of the differences regarding the degree of disability and physical function, the results of each recruiting site had to be analyzed separately. The lack of expected associations between physical function and impairments may be a result of the small sample size. Another limitation was selection bias because the participants were all volunteers and some were currently participating in structured physical activity programs at their respective facilities. Additionally, the assessment tool utilized for cognitive function (MMSE) is influenced by educational levels and age (Crum, Anthony,

Bassett, & Folstein, 1993), thus the MMSE scores in this sample may reflect the varied education levels of the participants rather than cognitive impairment. However, there were no differences on disability, physical function, pain or dyspnea according to MMSE scores. Therefore, the inclusion of participants with various levels of cognitive status may not be a major limitation of this study. A limitation to generalizability is that all the data collected pertained to a particular urban sample and may not be true in other populations or other parts of the country. On the other hand, recruiting participants from two diverse groups may have increased generalizability. Finally, another strength of this study was the inclusion of a larger number of females, which reflects the general population of older adults, thus increasing external validity.

Based on the potential influence of sedentary lifestyle and hypokinetic diseases and conditions on all elements of the disablement pathway, future research efforts should include a comparison of active and inactive culturally diverse older adults on the disablement constructs, as well as describing the results of physical activity interventions for this population.

Additionally, a larger sample is crucial to increase statistical power and possibly reveal significant relations between the constructs of the Disablement Process model. Recruiting more men into these studies is also important to increase the generalizability of future findings.

Another topic that deserves further investigation is the origin of the elevated rate of disability among culturally diverse older adults. Based on the disablement process, numerous risk factors (e.g. exposure to environmental risks), buffers (e.g. access to care), and exacerbators may be explored as potential sources of disparity in ADL disability. Mechanisms underlying the disability process are another interesting area of research. Understanding how pathologies evolve into impairments, functional limitation, and ultimately disability, as well as knowing how intra and extra-individual factors act to accelerate or delay the disabling process can greatly improve

prevention efforts. Lastly, utilizing measures of cognitive status that are not dependent on educational status may enhance the assessment of cognitive status in culturally diverse older adults.

In summary, physical function, dyspnea, and pain contribute to ADL disability in a sample of culturally diverse community-living older adults. The Disablement Process was a useful framework to understand ADL disability in this understudied population. The findings of this study support functional limitation as the main predictor of disability, followed by impairments; however, it is possible that pain should be classified as a functional limitation rather than impairment. Overall, the Disablement Process model provides a valuable conceptual framework to the progression of disability in a sample high-risk population. In addition, the model identifies physical function and pain as crucial stages in this progression, thus recognizing them as potential sites for intervention strategies.

REFERENCES

- Adler, J. J., Bloss, C. M., & Mosley, K. T. (1966). The Oklahoma state department of health mobile multiphasic screening program for chronic disease. Part 2. *American Journal of Public Health*, 56, 2066-2082.
- Agüero-Torres, H., Fratiglione, L., Guo, Z., Viitanen, M., von Strauss, E., & Winblad, B. (1998). Dementia is the major cause of functional dependence in the elderly: 3-year follow-up data from a population-based study. *American Journal of Public Health*, 88, 1452-1456.
- American College of Sports Medicine Position Stand: Exercise and Physical Activity in Older Adults. (1998). *Medicine and Science in Sports and Exercise*, 30, 992 – 1008.
- Anthony, J. C., LeResche, L., Niaz, U., von Korff, M. R., & Folstein, M. F. (1982). Limits of the 'Mini-Mental State' as a screening test for dementia and delirium among hospital patients. *Psychological Medicine*, 12, 397-408.
- Avlund, K. (2004). Disability in old age. Longitudinal population-based studies of the disablement process. *Danish Medical Bulletin*, 51, 315-349.
- Barberger-Gateau, P., Tessier J.F., & Nejjari, C. (1997). Dyspnoea and disability: An epidemiological approach. *Critical Reviews in Physical and Rehabilitative Medicine*, 9, 265-299.
- Bestall, J.C., Paul, E.A., Garrod, R., Garnham, R., Jones, P.W., & Wedzicha, J.A. (1999). Usefulness of the Medical research council (MRC) dyspnea scale as a measure of disability in patients with chronic obstructive pulmonary disease. *Thorax*, 54, 581-586.
- Boslaugh, S.E., & Andresen, E. M. (2006). Correlates of physical activity for adults with disability. *Preventing Chronic Disease*, 3, A78.
- Brooks, D., Davis, A. M., & Naglie, G. (2006). Validity of 3 physical performance measures in inpatient geriatric rehabilitation. *Archives of Physical Medicine and Rehabilitation*, 87, 105-110.
- Carlson, J. E., Ortir, G. V., Black, S. A., Markides, K. S., Rudkin, L., Goodwin, J. S. (1999). Disability in older adults. 2: Physical activity as prevention. *Behavioral Medicine*, 24, 157 – 168.
- Casaburi, R., Patessio, A., Loli, F., Zanaboni, S., Donner, C. F., & Wasserman, K. (1991). Reduction in exercise lactic acidosis and ventilation as a result of exercise training in patients with obstructive lung disease. *The American Review of Respiratory Disease*. 143, 9 –18.

- Cobb, S. (1971). The frequency of rheumatic diseases. Cambridge, MA: Harvard University Press.
- Cole, M. G., & Dendukuri, N. (2003). Risk factors for depression among elderly community subjects: a systematic review and meta-analysis. *The American Journal of Psychiatry*, 160, 1147 – 1156.
- Corti, M. C., Salive, M. E., Guaralnik, J. (1996). Serum albumin and physical function as predictors of of coronary heart disease mortality and incidence in older persons. *Journal of Clinical Epidemiology*, 49, 519-526.
- Cress, M. E. (1997). Quantifying physical functionan performance in older adults. *Muscle & Nerve*, 20 (Suppl. 5), 17-20.
- Cress, M.E., Buchner, D.M., Questad, Q.A., Esselman, P.C., deLateur, B.J., Schwartz, R.S. (1996) Continuous-scale physical functional performance in healthy older adults: A validation study. *Archives of Physical Medicine and Rehabilitation*, 77, 1243-1250.
- Cress, M.E., Patrella, J.K., Moore, T.L., Schenkman, M.L. (2005) Continuous-scale physical functional performance test: Validity, reliability, and sensitivity of data for the short version. *Physical Therapy*, 85, 323-335.
- Cress, M.E., Schechtman, K. B., Mulrow, C. D., Fiatarone, M. A., Gerety, M.B., Buchner, D.M. (1995) Relationship between physical performance and self-perceived physical function. *Journal of the American Geriatrics Society*, 43, 93-101.
- Crum, R.M., Anthony, J.C., Bassett, S.S., & Folstein, M.F. (1993). Population-based norms for the Mini-Mental State Examination by age and educational level. *The Journal of the American Medical Association*, 269, 2386-2391.
- Dick, J. P., Guiloff, R. J., Stewart, A., Blackstock, J., Bielawska, C., Paul, E. A., et al. (1984). Mini-mental state examination in neurological patients. *Journal of Neurology, Neurosurgery, and Psychiatry*, 47, 496-499.
- Donaldson, L. J. , Clayton, D. G., Clarke, M. (1980). The elderly in residential care: Mortality in relation to functional capacity. *Journal of Epidemiology and Community Health*, 34, 96-101.
- Durstine, J. L., & Moore, G., E. (2003). *ACSM's Exercise Management for Persons with Chronic Diseases and Disabilities*. (2nr ed). Champaign, IL: Human Kinetic.
- Dyspnea. Mechanisms, assessment, and management: a consensus statement. American Thoracic Society. (1999). *American Journal of Respiratory and Critical Care Medicine*, 159, 321-340.

- Ellis Gardner, R., Allen, P. D., Cherry, K. E., Monroe, P. A., O'Neil, C. E., & Wood, R. H. (2006). Baseline results of an interdisciplinary effort to promote healthy aging among culturally diverse adults. *Medicine & Science in Sports & Exercise*, 38, S305.
- Femia, E. E., Zarit, S. H., & Johansson, B. (1997). Predicting change in activities of daily living: A longitudinal study of the oldest-old in Sweden. *Journal of Gerontology: Psychological Sciences*, 52B, P294-P302.
- Femia, E. E., Zarit, S. H., & Johansson, B. (2001). The disablement process in very late life: A study of the oldest-old in Sweden. *Journal of Gerontology: Psychological Sciences*, 56B, P12-P23.
- Ferraro, K. F. (1993). Are Black older adults health-pessimistic? *Journal of Health and Social Behavior*, 34, 201-214.
- Ferrucci, L., Penninx, B. W. J. H., Leveille, S. G., Corti, M. C., Pahor, M., Wallace, R., et al. (2000). Characteristics of nondisabled older persons who perform poorly in objective tests of lower extremity function. *Journal of the American Geriatrics Society*, 48, 1102-1110.
- Folstein, M. F., Folstein, S. E., & McHugh, P. R. (1975). 'Mini-Mental State': A practical method for grading the cognitive status of patients for the clinician. *Journal of Psychiatric Research*, 12, 189-198.
- Folstein, M. F., Folstein, S. E., McHugh, P. R., & Fanjiang, G. (2001). *Mini-mental state examination: User's guide*. Odessa, FL: Psychological Assessment Resources.
- Frankel, J. E., Bean, J. F., & Frontera, W. R. (2006). Exercise in the elderly: Research and clinical practice. *Clinics in Geriatric Medicine*, 22, 239 – 256.
- Fried, L.P., Bandeen-Roche, K., Chaves, P.H.M., Johnson, B.A. (2000). Preclinical mobility disability predicts incident mobility disability in older women. *Journal of Gerontology*, 55A, M43-M52.
- Fried L.P, Bandeen-Roche, K., Kasper, J., & Guralnick, J. M. (1999). Associations of comorbidities with disability in older women: The women's health and aging study. *Journal of Clinical Epidemiology*, 52, 27-37.
- Fried, L. P, Guralnik, J. M. (1997). Disability in older adults: Evidence regarding significance, etiology, and risk. *Journal of the American Geriatrics Society*, 45, 92-100.
- Gibson, R. C. (1991). Age-by-race differences in the health and functioning of elderly persons. *Journal of Aging Health*, 3, 335-351.

- Gibson, S. J., & Helme, R. D. (2001). Age-related differences in pain perception and report. *Clinics in Geriatric Medicine*, 17, 433-456.
- Gill, T. M., Allore, H. & Guo, Z. (2003). Restricted activity and functional decline among community-living older persons. *Archives of Internal Medicine*, 163, 1317-1222.
- Gill, T. M., Richardson, E.D., & Tinetti, M. E. (1995). Evaluating the risk of dependence in activities of daily living among community-living older adults with mild to moderate cognitive impairment. *Journal of Gerontology: Medical Sciences*, 50A, M235-M241.
- Gill, T. M., Robison, J. T., & Tinetti, M. E. (1998). Difficulty and dependence: two components of the disability continuum among community-living older persons. *Annals of Internal Medicine*, 128, 96-101.
- Gill, T.M., Williams, C.S., Richardson, E.D., & Tinetti, M.E. (1996). Impairment in physical performance and cognitive status as predisposing factor for functional dependence among non-disabled older persons. *Journal of Gerontology: Medical Sciences*, 51A, M283-M288.
- Gill, T. M., Williams, C. S., & Tinetti, M. E. (1995). Assessing risk for onset of functional dependence among older adults: The role of physical performance. *Journal of the American Geriatrics Society*, 43, 603-609.
- Guralnik, J.M. (1994). Understanding the relationship between disease and disability. *Journal of the American Geriatrics Society*, 42, 1128-1129.
- Guralnik, J.M., Ferrucci, L., Pieper, C.F., Leveille, S.G., Karkides, K.S., Ostir, G.V., et al. (2000). Lower-extremity function and subsequent disability: Consistency across studies, predictive models, and value of gait speed alone compared with the short physical performance battery. *Journal of Gerontology: Medical Sciences*, 55A, M221-M231.
- Guralnik, J.M., Ferrucci, L., Simonsick, E.M., Salive, M.E., Wallace, R.B. (1995). Lower-extremity function in persons over the age of 70 years as a predictor of subsequent disability. *The New England Journal of Medicine*, 332, 556-561.
- Guralnik, J.M., Fried, L. P., & Salive, M. E. (1996). Disability as a public health outcome in the aging population. *Annual Review of Public Health*, 17, 25-46.
- Guralnik, J.M., Simonsick, E.M., Ferrucci, L., Glynn, R. J., Berkman, L.F., Blazer, D. G., et al. (1994). A short physical performance battery assessing lower-extremity function: Association with self-reported disability and prediction of mortality and nursing home admission. *Journal of Gerontology: Medical Sciences*, 49A, M85-M94.

- Gurland, B.J., Wilder, D. E., Berkman, C. (1988) Depression and disability in the elderly: Reciprocal relations and changes with age, *International Journal of Geriatric Psychiatry*, 3, 163 – 179.
- Hardy, S. E., & Gill, T. M. (2005). Factors associated with recovery of independence among newly disabled older persons. *Archives of Internal Medicine*, 165, 106-112.
- He, W., Sengupta, M., Velkoff, V. A., & DeBarros, K. A. (2005, December). *65+ in the United States: 2005*. U.S. Department of Health and Human Services, National Institutes of Health, National Institute on Aging & U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau. . Retrieved November 14, 2006, from U.S. Census Bureau Current Population Reports Online
<http://www.census.gov/ipc/www/usinterimproj/natprojtab02a.pdf>
- Hing, E., Bloom, B. (1990). Long-term care for the functionally dependant elderly. *Vital Health and Statistics*, 104, 1-50.
- Ho, S.F., O'Mahony, M.S., Steward, J.A., Breay, P., Buchalter, M., & Burr, M.L. (2001) Dyspnea and quality of life in older people at home. *Age and Ageing*, 30, 155-159.
- Hoeymans, N., Feskens, E. J., Kromwout, D., & van den Bos, G. A. (1997). Ageing and the relationship between functional status and self-rated health in elderly men. *Social Science and Medicine*, 45, 1527-1536
- Holzer, C., Tischler, G., Leaf, P., & Myers, J. (1984). An epidemiologic assessment of cognitive impairment in a community population. In J. R. Greenley (Ed.), *Research in community and mental health*, 4, (vol. 4, pp. 3-32). New York: JAI Press.
- Hopp, G. A., Dixon, R. A., Grut, M., & Bäckman, L. (1997). Longitudinal and psychometric profiles of two cognitive status tests in very old adults. *Journal of Clinical Psychology*, 53, 673-686.
- Howley, E. T., & Franks, B. D. (2003). *Health Fitness Instructors Handbook*. 4th Edition. Champaign, IL: Human Kinetics.
- Hughes, S.L., Dunlop, D., Edelman, P., Chang, R.W., & Singer, R.H. (1994). Impact of joint impairment on longitudinal disability in elderly persons. *Journal of Gerontology: Social Sciences*, 49, S291-S300.
- Issa, S. N., & Sharma, L. (2006). Epidemiology of arthritis: An update. *Current Rheumatology Reports*, 8, 7 – 15.
- Jette, A.M. (1980). Functional status index: Reliability of a chronic disease evaluation instrument. *Archives of Physical Medicine and Rehabilitation*, 61, 395-401.

- Jette, A.M. (1987). The Functional Status Index: Reliability and validity of a self-report functional disability measure. *The Journal of Rheumatology Supplement*, 14, 15-21.
- Jette, A. A. (1996). Disability trends and transitions. In R. H. Binstock & L. K. George (Eds.), *Handbook of aging and the social sciences* (pp. 94-116). San Diego, CA: Academic Press.
- Johnson, N. E. (2000). The racial crossover in comorbidity, disability, and mortality. *Demography*, 37, 267-283.
- Jorm, A. F., Scott, R., Henderson, A. S., & Kay, D. W. (1988). Educational differences on the mini-mental state: The role of test bias. *Psychological Medicine*, 18, 727-731.
- Judge, J.O., Schechtman, K., & Cress, E. (1996). The relationship between physical performance measures and independence in instrumental activities of daily living. *Journal of the American Geriatrics Society*, 44, 1332-1341.
- Kafonek, S., Ettinger, W. H., Roca, R., Kittner, S., Taylor, N., & German, P. S. (1989). Instruments for screening for depression and dementia in a long-term care facility. *Journal of the American Geriatrics Society*, 37, 29-34.
- Kay, D. W., Henderson, A. S., Scott, R., Wilson, J., Rickwood, D., & Grayson, D. A. (1985). Dementia and depression among the elderly living in the Hobart community: The effect of the diagnostic criteria on the prevalence rates. *Psychological Medicine*, 15, 771-788.
- Kempen, G. I. J. M., Steverink, N., Ormel, J., Deeg, D. J. H. (1996). The assessment of ADL among frail elderly in an interview survey: Self-report versus performance-based tests and determinants of discrepancies. *Journal of Gerontology: Psychological Sciences*, 51B, P254-P260.
- Kivela, S.L., Pakkala, K. (2001). Depressive disorder as a predictor of physical disability in old age. *Journal of the American Geriatrics Society*, 49, 290-296.
- LaCroix, A. Z., Guralnick, J. M., Berkman, L. F., Wallace, R. B., & Satterfield, S. (1993). Maintaining mobility in late life. II. Smoking, alcohol consumption, physical activity, and body mass index. *American Journal of Epidemiology*, 137, 858-869.
- Langlois J.A., Maggi, S., Harris, T., Simonsick, E. M., Ferrucci, L., Pavan, M., et al. (1996) Self-report of difficulty in performing functional activities identifies a broad range of disability in old age. *Journal of the American Geriatrics Society*, 44, 1421-1428.
- Lawrence, R. H., Jette, A. M. (1996). Disentangling the disablement process. *Journal of Gerontology: Social Sciences*, 51B, S173-S183.
- Li, L. W. (2005). Predictors of ADL disability trajectories among low-income frail elders in the community. *Research on Aging*, 27, 615-642.

- Manton, K.G., Patrick, C.H., & Johnson, K.W. (1987). Health differentials between Blacks and Whites: Recent trends in mortality and morbidity. *Milbank Memorial Fund Quarterly*, 65 (Suppl. 1), 129-199.
- March, L.M., Brnabic, A.J., Skinner, J.C., Schwarz, J.M., Finnegan, T., Druce, J., Brooks, P.M. (1998). Musculoskeletal disability among elderly people in the community. *The Medical Journal of Australia*, 168, 439-442.
- Mendes de Leon, C.F., Barnes, L. L., Bienias, J. L., Skarupski, K. A., & Evans, D. A. (2005). Racial disparities in disability: recent evidence from self-reported and performance-based measures in a population-based study of older adults. *Journal of Gerontology: Social Sciences*, 60B, S263 – S271.
- Mendes de Leon, C.F., Beckett, L. A., Fillenbaum, G. G., Brock, D. B., Branch, L. G., Evans, D. A., et al. (1997). Black-White differences in risk of becoming disabled and recovering from disability in old age: A longitudinal analysis of two EPESE populations. *American Journal of Epidemiology*, 145, 488-497.
- Mendes de Leon, C.F., Fillenbaum, G. G., Williams, C. S., Brock, D. B., Beckett, L. A., & Berkman, L. F. (1995). Functional disability among elderly Blacks and Whites in two diverse areas: The New Haven and North Carolina EPESE. *American Journal of Public Health*, 85, 994-998.
- Miller, M. E., Rejesky, W. J., Reboussin, B. A., Ten Have, T. R., Ettinger, W. H., (2000). Physical activity, functional limitations, and disability in older adults. *Journal of the American Geriatrics Society*, 48, 1264-1272.
- Moody-Ayers, S. Y., Mentha, K. M., Lindquist, K., Sands, L., & Covinsky, K. E. (2005). Black-white disparities in functional decline in older persons: the role of cognitive function. *The Journals of Gerontology: Biological Science and Medical Science*, 60, 933 – 939.
- Molloy, D. W., Alemayehu, E., & Roberts, R. (1991). Reliability of a standardized mini-mental state examination compared with the traditional mini-mental state examination. *The American Journal of Psychiatry*, 148, 102-105.
- Monsó, E., Fiz, J. M., Izquierdo, J., Alonso, J., Coll, R., Rosell, A., et al. (1998). Quality of life in severe chronic obstructive pulmonary disease: Correlation with lung and muscle function. *Respiratory Medicine*, 92, 221-227.
- Mossey, J.M., Gallagher, R.M., & Tirumalasetti, F. (2000). The effects of pain and depression on physical functioning in elderly residents of a continuing care retirement community. *Pain Medicine*, 1, 340-350.

- Muza, S.R., Silverman, M.T., Gilmore, G.C., Hellerstein, H.K., & Kelsen, S.G. (1990). Comparison of scales used to quantitate the sense of effort to breathe in patients with chronic obstructive pulmonary disease. *The American review of respiratory disease*, 141, 909-13.
- Nagi, S.Z. (1965). Sociology and Rehabilitation. Some conceptual issues in disability and rehabilitation. 100-113.
- Oga, T., Nishimura, K, Tsukino, M., Hajiro, T., & Mishima, M. (2005). Dyspnoea with activities of daily living versus peak dyspnoea during exercise in male patients with COPD. *Respiratory Medicine*, 100, 965-971.
- Ostir, G. V., Carlson, J. E., Black, S. A., Rudkin, L., Goodwin, J. S., Markides, K. S. (1999). Disability in older adults 1: Prevalence, causes, and consequences. *Behavioral Medicine*, 24, 147-156.
- Ostir, G. V., Markides, K. S., Black, S. A., & Goodwin, J. S. (1998). Lower body functioning as a predictor of subsequent disability among older Mexican-Americans. *Journal of Gerontology: Medical Sciences*, 53A, M491-M495.
- Partridge, C., Johnston, M., & Morris, I. (1996). Disability and health: perceptions of a sample of elderly people. *Physiotherapy Research International*, 1, 17-19.
- Peek, M. K., Patel, K. V., & Ottenbacher, K. J. (2005). Expanding the disablement process model among older Mexican Americans. *The Journals of Gerontology: Biological Sciences and Medical Sciences*, 60, 334-339.
- Pérès, K., Verret, C., Alioum, A., & Barberger-Gateau, P. (2005). The disablement process: Factors associated with progression of disability and recovery in French elderly people. *Disability and Rehabilitation*, 27, 263-276.
- Reuben, D. B., Valle, L. A., Hays, R. D., & Siu, A. L. (1995). Measuring physical function in community-dwelling older persons: a comparison of self-administered, interviewer-administered, and performance-based measures. *Journal of the American Geriatrics Society*, 43, 17-23.
- Reuben, D. B., Siu, A. L. (1990). An objective measure of physical function of elderly outpatients. The Physical Performance Test. *Journal of the American Geriatrics Society*, 38, 1105-12.
- Reynolds, S.L., & Silverstein, M. (2003). Observing the onset of disability in older adults. *Social Sciences & Medicine*, 57, 1875-1889.
- Rice, D. P., & LaPlante, M. P. (1992). Medical expenditures for disability and disabling comorbidities. *American Journal of Public Health*, 82 5, 739 – 741.

- Rikly, R.E., Jones, C.J. (2001). Senior Fitness Test Manual. Champaign, IL: Human Kinetics.
<http://www.icaa.cc/Journal%20on%20Active%20Aging/Journalarticles/Journalarticles2/measuringfunctionalfitness2.pdf>
- Ross, M.M., & Crook, J. (1998). Elderly recipients of home nursing services: pain disability and functional competence. *Journal of Advanced Nursing*, 27, 1117-1126.
- Schroll, M., Lovborg, B., Munck, M., Avlund, K. & Davidsen, M. (1997). Cardiac impairment as assessed by echocardiography related to work capacity and mobility in 75 year old Danes as part of NORA 75. *Cardiology*, 182-193.
- Scudds, R.J., & McD Robertson, J. (1998). Empirical evidence of the association between the presence of musculoskeletal pain and physical disability in community-dwelling senior citizens. *Pain*, 75, 229-235.
- Steinmetz, E. *Americans with disability: 2002: Household economic studies..* US Department of Commerce, Economics and Statistics Administration, US Census Bureau. Issued May 2006. Retrieved November 14, 2006, from <http://www.census.gov/prod/2006pubs/p70-107.pdf>
- Sue, D. Y., Wasserman, K., Moricca, R. B., & Casaburi, R. (1988). Metabolic acidosis during exercise in patients with chronic obstructive pulmonary disease. *Chest*, 94, 93 –98.
- Tanaka, K., Akeschi, T., Okuyama, T., Nishiwaki, Y., & Uchitomi, Y. (2002). Impact of dyspnea, pain, and fatigue on daily life activities in ambulatory patients with advanced lung cancer. *Journal of Pain and Symptom Management*, 23, 417-423.
- Tanaka, K., Akeschi, T., Okuyama, T., Nishiwaki, Y., & Uchitomi, Y. (2002). Prevalence and screening of dyspnea interfering with daily life activities in ambulatory patients with advanced lung cancer. *Journal of Pain and Symptom Management*, 23, 484-489.
- Thomas, E., Peat, G., Harris, L., Wilkie, R., & Croft, P.R. (2004). The prevalence of pain and pain interference in a general population of older adults: Cross-sectional findings from the North Staffordshire Osteoarthritis Project (NorStOP). *Pain*, 110, 361-368.
- Tinetti, M.E., Ginter, S.F. (1988). Identifying mobility dysfunctions in elderly patients. Standard neuromuscular examination or direct assessment? *The Journal of the American Medical Association*, 26, 1190-3.
- Tombaugh, T. N., McDowell, I., Kristjansson, B., & Hubley, A. M. (1996). Mini-mental state examination (MMSE) and the modified MMSE (3MS): A psychometric comparison and normative data. *Psychological Assessment*, 8, 48-59.
- Tombaugh, T. N., & McIntyre, N. J. (1992). The Mini-Mental State Examination: A comprehensive review. *Journal of American Geriatrics Society*, 40, 922-935.

- U.S. Census Bureau (2002). *Race and Hispanic or Latino origin by age and sex in the U.S.: 2000*. Created February, 2002; last revised July, 2002. Retrieved June 30, 2006, from <http://www.census.gov/population/www/cen2000/phc-t08.html>
- U.S. Census Bureau (2004). *Educational attainment in the U.S: 2004*. Created March, 2004; last revised March 2004. Retrieved June 20, 2006, from <http://www.census.gov/population/www/socdemo/education/cps2004.html>
- U.S. Department of Health and Human Services (2004). *Health Data for All Ages (HDAAS)*. Atlanta, Georgia: Centers for Disease Control and Prevention, National Center for Health Statistics. Retrieved November 14, 2006, from <http://209.217.72.34/HDAA/TableViewer/tableView.aspx?ReportId=82>
- Van den Brink, C. L., Tijhuis, M., Kalmijn, S., Klazinga, N. S., Nissinen, A., Giampaoli, S., Kivinen, P., Kromhout, D., & van den Bos, G. (2003). Self-reported disability and its association with performance-based limitation in elderly men: a comparison of three European countries. *Journal of the American Geriatrics Society*, 51, 782-788.
- Van Gool, C. H., Kempen, G. I. J. M., Penninx, B. W. J. H., Deeg, D. J. H., Beekman, A. T. F., van Eijk, J. Th. M. (2005). Impact of depression on disablement in late middle aged and older persons: Results from longitudinal aging study Amsterdam. *Social Science and Medicine*, 60, 25-36.
- Verbrugge, L.M., Jette, A.M. (1994). The disablement process. *Social Science and Medicine*, 38, 1-14.
- Waldrop, J., Stern, S. M. *Disability Status 2000*. U.S. Department of Commerce, Economics and Statistics Administration, US Census Bureau. Issued March, 2003, Retrieved November 14, 2006, from <http://www.census.gov/prod/2003pubs/c2kbr-17.pdf>
- Wilson, I. B., Cleary, P. D. (1995), Linking clinical variables with health-related quality of life. *The Journal of the American Medical Association*, 273, 59- 65.
- Wolinsky, F.D., Stump, T.E., Callahan, C. M., Johnson, R.J. (1996). Consistency and changes in functional status among older adults over time. *Journal of Aging and Health*, 8, 155-182.
- World Health Organization: The International Classification of Impairments, Disabilities, and Handicaps. A manual classification relating to the consequences of diseases. Geneva, 1980.
- World Health Organization. ICF. International Classification of Functioning, Disability, and Health, Geneva, 2004.
- Wright, G. W., & Branscomb, B. V. (1954). The origin of the sensations of dyspnea. *Transactions of the American Clinical and Climatological Association*, 66, 116–125.

- Yang, W., George, L. (2005) Functional disability, disability transitions, and depressive symptoms in late life. *Journal of Aging and Health*, 17, 263-92.
- Yeh, M., Chen, H., Liao, Y., & Liao, W. (2004). Testing the functional status model in patients with chronic obstructive pulmonary disease. *Issues and Innovations in Nursing Practice*, 48, 342-350.
- Zsembik, B. A., Peek, M. K., & Peek, C. W. (2000). Race and ethnic variation in the disablement process. *Journal of Aging Health*, 12, 229-249.

APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL



Institutional Review Board
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LSU IRB ACTION ON PROTOCOL APPROVAL REQUEST

TO: Rebecca E. Gardner
Kinesiology

FROM: Robert C. Mathews
Chair, Institutional Review Board for Research with Human Subjects

DATE: March 14, 2007

C: IRB# 2617

TITLE: "Falls and Fracture Risk in Southeast Louisiana Seniors"

New Protocol/Modification: M

Review type: Full ☐ Expedited ☒ **Review date:** 03/14/2007

Approved ☒ **Disapproved** ☐

Approval Date: 03/14/2007 **Approval Expiration Date:** 01/08/2008

Risk Assessment: Minimal ☒ Uncertain ☐ Greater than Minimal ☐

Re-review frequency: (annual unless otherwise stated)

Number of subjects approved: 1000

By: Robert C. Mathews 

PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING -- Continuing approval is CONDITIONAL on:

1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
7. Notification of the IRB of a serious compliance failure.
8. SPECIAL NOTE:

*All investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at <http://www.osr.lsu.edu/osr/comply.html>

APPENDIX B

CONSENT FORM for the study of:

Increasing Physical Activity and Healthy Diet Behavior among Culturally Diverse Seniors

Co-Principal Investigators:

Robert H. Wood, Ph.D. LSU Kinesiology Department (225) 578-9142

Rebecca Ellis Gardner, Ph. D. LSU Kinesiology Department (225) 578-5954

INVITATION TO PARTICIPATE: I am being asked to participate in this study because I am 65 years of age or older, and I participate in activities at the Leo S. Butler community centers, LSU Rec Sports Complex, or the Coopers Fitness Center in Dallas, Texas, or reside at the Catholic Presbyterian Apartments in downtown Baton Rouge.

PURPOSE OF THE STUDY: The purpose of the proposed study is to examine the extent to which an 18-week health promotion and supervised exercise program and 6 months of unsupervised home exercise will improve my physical activity, physical function, and quality of life.

PROCEDURES:

As a subject in this study I will be answering questions regarding my health and medical history, my attitudes, behaviors, and beliefs about diet and exercise, and my perceived physical function and quality of life. I also understand that the investigators will ask me to perform tests of physical and cognitive function that relate to my ability to perform tasks of every day living. Cognitive tasks include remembering numbers and identifying vocabulary words. Physical tasks include activities such as normal walking, carrying a pot, emptying a washer and dryer, carrying groceries, etc. During the physical tasks I may be videotaped.

In addition, I understand that the investigators will assign me to one of three groups. Two groups will receive counseling about diet and exercise behavior and will be asked to perform a variety of exercises at their respective facilities two days per week, and at home on other days of the week, for a period of 18 weeks. Following this 18-week period, I will be asked to exercise at home 3 days per week for a period of 6 months. Throughout this entire period, I will receive occasional phone calls from the project personnel to assist with diet and exercise adherence. If assigned to the third group, I will be asked to participate in 18 weeks of exercise without counseling, and then will be allowed to exercise for a second 18-week period with counseling.

Lastly, I understand that at the end of the 18-week time period, I will be retested on a number of the questionnaires and on the physical and cognitive function tests.

BENEFITS: Proper physical activity and diet are known to improve heart and blood vessel health, muscle strength and endurance, lower risk of serious diseases, lower blood pressure, lower blood sugar, and improve emotional health.

RISKS: There are no risks involved in responding to the various surveys. Physical activity, however, does provide a small degree of risk for adverse responses that include: dizziness, nausea, fatigue, heightened blood pressure, heart attack, stroke, and in rare instances death. The most recent statistics suggest that one in four hundred thousand hours of moderate intensity exercise, among high-risk participants, results in adverse responses requiring medical attention. The exercises in this program are of low to moderate intensity, and therefore pose minimal risk.

ALTERNATIVES: The alternatives to the selected surveys are not significantly different in content. The surveys included were selected because they were deemed most appropriate for this age group. The alternatives to the field tests of physical function are the more obtrusive laboratory measures (e.g. maximal treadmill stress testing) of physical fitness. Again, the field tests that were selected for this investigation are thought to be most appropriate for this age group.

COMPENSATION: I understand that participation in the complete study will result in no monetary compensation.

HIPPA / CONFIDENTIALITY: Records that you give us permission to keep, and that identify you, will be kept confidential as required by law. Federal Privacy Regulations provide safeguards for privacy, security, and authorized access. Except when required by law, you will not be identified by name, social security number, address, telephone number, or any other direct personal identifier in records disclosed outside of Louisiana State University (LSU). For any records maintained outside of LSU, you will be assigned a unique code number.

DISCLAIMER WITHDRAWAL: I agree that my participation in this study is completely voluntary and that I may withdraw at any time without prejudicing my standing with the LSU.

This study has been discussed with me and my questions have been answered. I understand that if I have additional questions regarding the study they should be directed to Drs. Robert Wood and Rebecca Ellis Gardner, LSU Department of Kinesiology, (225) 578-9142, 578-5954. I understand that if I have questions about subjects' rights or other concerns, I can contact Robert Mathews, Chairman, LSU Institutional Review Board, (225) 578-8692. I agree to participate in the study described above and acknowledge that I have been given a copy of the consent form.

(subject's signature) Date

(investigator's signature) Date

(witness signature) Date

Subjects Unable to Read

‘The study subject has indicated to me that he/she is unable to read. I certify that I have read this consent form to the subject and explained that by completing the signature line above, the subject has agreed to participate.’

(Reader's signature) Date

APPENDIX C

PERSONAL HISTORY QUESTIONNAIRE

PART A: PARTICIPANT INFORMATION # _____

Date _____

1. NAME: _____	
2. AGE: _____	Do you have any documentation for verification of age? YES NO
3. SEX: MALE FEMALE	
4. MARITAL STATUS: Are you now:	
1. SINGLE, NEVER MARRIED	IF MARRIED, FOR HOW LONG? _____
2. MARRIED	
3. SEPARATED	
4. DIVORCED	
5. WIDOWED	
6. LIVING WITH YOUR PARTNER	
7. CHOSE NOT TO ANSWER	
8. DOES NOT KNOW	
5. EDUCATION: What is the highest grade in school you completed?	
1. LESS THAN 7 TH GRADE	
2. 7 TH -9 TH GRADE	
3. 10 TH -11 TH GRADE	
4. COMPLETED HIGH SCHOOL OR EQUIVALENT (GED)	
5. POST HIGH SCHOOL, BUSINESS OR TRADE SCHOOL	
6. SOME UNIVERSITY/COLLEGE, BUT NO DEGREE	
7. COMPLETED UNIVERSITY/COLLEGE	
8. SOME GRADUATE/PROFESSIONAL SCHOOL, BUT NO DEGREE	
9. COMPLETED GRADUATE/PROFESSIONAL SCHOOL	
10. CHOSE NOT TO ANSWER	
11. DOES NOT KNOW	
6. RACE/ETHNICITY: Do you consider yourself to be:	
1. AMERICAN INDIAN OR ALASKAN NATIVE	
2. ASIAN OR ASIAN AMERICAN	
3. BLACK, AFRICAN AMERICAN, NONHISPANIC	
4. HISPANIC OR LATINO AMERICAN	
5. PACIFIC ISLANDER	
6. WHITE, EUROPEAN AMERICAN, NONHISPANIC	
7. OTHER (PLEASE SPECIFY) _____	
8. CHOSE NOT TO ANSWER	
9. DOES NOT KNOW	
7. EMPLOYMENT STATUS: Are you currently:	
1. RETIRED	
2. PART-TIME	
3. FULL TIME	
4. UNEMPLOYED	
5. HOMEMAKER	
6. OTHER (SPECIFY): _____	
7. CHOSE NOT TO ANSWER	
8. DOES NOT KNOW	

<p>8. HOUSING: Where do you live?</p> <ol style="list-style-type: none"> 1. HOUSE 2. INDEPENDENT LIVING APARTMENT OR CONDOMINIUM 3. SHARED HOUSING (NON-FAMILY) OR GROUP HOME 4. RETIREMENT HOME 5. ASSISTED LIVING FACILITY 6. NURSING HOME 7. OTHER (SPECIFY): _____ 8. CHOSE NOT TO ANSWER 9. DOES NOT KNOW 																											
<p>9. DATE THAT YOU MOVED INTO CURRENT HOUSING: _____</p> <ol style="list-style-type: none"> 1. CHOSE NOT TO ANSWER 2. DOES NOT KNOW 																											
<p>10. LIVING ARRANGEMENTS: Who lives with you? Circle all that apply and indicate how many.</p> <ol style="list-style-type: none"> 1. NO ONE; I LIVE ALONE 2. HUSBAND, WIFE, OR PARTNER 3. CHILDREN (INCLUDING IN-LAWS) _____ 4. GRANDCHILDREN _____ 5. PARENTS _____ 6. BROTHERS AND SISTERS _____ 7. OTHER RELATIVES _____ 8. FRIENDS/HOUSEMATES _____ 9. NON-RELATED PAID HELPER _____ 10. OTHER (SPECIFY): _____ 11. CHOSE NOT TO ANSWER 12. DOES NOT KNOW 																											
<p>11. SOURCES OF INCOME: Please identify all of the sources of your income.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">1. TANF</td> <td style="width: 33%;">9. SSI</td> <td style="width: 33%;">17. TENANT STIPEND</td> </tr> <tr> <td>2. ALIMONY</td> <td>10. MEDICAL REIMBURSEMENT</td> <td>18. UNEMPLOYMENT</td> </tr> <tr> <td>3. CHILD SUPPORT</td> <td>11. IMPUTED WELFARE INCO</td> <td>19. VETERAN'S BENEFITS</td> </tr> <tr> <td>4. OWN BUSINESS</td> <td>12. MILITARY PAY</td> <td>20. WELFARE</td> </tr> <tr> <td>5. FEDERAL WAGES</td> <td>13. ASSETS</td> <td>21. EARNED DISREGARD</td> </tr> <tr> <td>6. FOSTER CARE SUBSIDY</td> <td>14. DISALLOWANCE 100%</td> <td>22. NON-EARNED DISREGARD</td> </tr> <tr> <td>7. WAGES</td> <td>15. PENSION</td> <td>23. CHOSE NOT TO ANSWER</td> </tr> <tr> <td>8. INCOMES DISALLOWANCE</td> <td>16. SOCIAL SECURITY</td> <td>24. DOES NOT KNOW</td> </tr> <tr> <td></td> <td></td> <td>25. OTHER</td> </tr> </table>	1. TANF	9. SSI	17. TENANT STIPEND	2. ALIMONY	10. MEDICAL REIMBURSEMENT	18. UNEMPLOYMENT	3. CHILD SUPPORT	11. IMPUTED WELFARE INCO	19. VETERAN'S BENEFITS	4. OWN BUSINESS	12. MILITARY PAY	20. WELFARE	5. FEDERAL WAGES	13. ASSETS	21. EARNED DISREGARD	6. FOSTER CARE SUBSIDY	14. DISALLOWANCE 100%	22. NON-EARNED DISREGARD	7. WAGES	15. PENSION	23. CHOSE NOT TO ANSWER	8. INCOMES DISALLOWANCE	16. SOCIAL SECURITY	24. DOES NOT KNOW			25. OTHER
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8. INCOMES DISALLOWANCE	16. SOCIAL SECURITY	24. DOES NOT KNOW																									
		25. OTHER																									
<p>12. SOCIOECONOMIC STATUS: Taking into consideration all sources of income, what was the total gross income before taxes last year for you and your family? Please indicate which range best describes your total family annual income.</p> <ol style="list-style-type: none"> 1. \$5,000 OR LESS 2. \$5,001-10,000 3. \$10,001-20,000 4. \$20,001-30,000 5. \$30,001-40,000 6. \$40,001-50,000 7. \$50,001-60,000 8. \$60,001-70,000 9. \$70,001-80,000 10. \$80,001-90,000 11. \$90,001-100,000 12. \$100,001 AND ABOVE 13. CHOSE NOT TO ANSWER 																											

14.	DOES NOT KNOW
13. RELIGION: Do you regularly attend church? 1. YES If YES, what is the name of the church you usually attend? _____ 2. NO 3. CHOSE NOT TO ANSWER 4. DOES NOT KNOW	
14. DOCTOR VISITS: How many times have you visited a doctor as a patient in the past year? 1. NONE 2. 1-3 3. 4-6 4. OVER 6 TIMES 5. CHOSE NOT TO ANSWER 6. DOES NOT KNOW	
15. HOSPITAL STAYS: How many times have you stayed in the hospital overnight as a patient in the past year? 1. NONE 2. 1-3 3. 4-6 4. OVER 6 TIMES 5. CHOSE NOT TO ANSWER 6. DOES NOT KNOW	
16. SICK IN BED: How many days have you been home sick in bed in the past year? 1. NONE 2. 1-7 3. 8-14 4. OVER 14 DAYS 5. CHOSE NOT TO ANSWER 6. DOES NOT KNOW	
17. CONTACT INFORMATION: Verify information for accuracy. APARTMENT NUMBER _____ TELEPHONE NUMBER _____ IF NO TELEPHONE NUMBER, WHAT IS THE BEST WAY TO CONTACT YOU? _____ _____	

APPENDIX D

HEALTH STATUS QUESTIONNAIRE

Health Status Questionnaire

Instructions

Complete each question accurately. All information provided is confidential if you choose to submit this form to your fitness instructor.

Part 1. Information about the individual

1. Social Security number _____ Date _____
2. Legal name _____ Nickname _____
3. Mailing address _____ Home phone _____
_____ Business phone _____
4. EI _____ Personal physician _____ Phone _____
Address _____
5. EI _____ Person to contact in emergency _____ Phone _____
6. Gender (circle one): Female Male (RF)
7. RF Date of birth: _____
Month Day Year
8. Number of hours worked per week: Less than 20 20-40 41-60 Over 60
9. SLA More than 25% of time spent on job (circle all that apply)
Sitting at desk Lifting or carrying loads Standing Walking Driving

Part 2. Medical history

10. RF Circle any who died of heart attack before age 50:
Father Mother Brother Sister Grandparent
11. Date of
Last medical physical exam: _____
Year
Last physical fitness test: _____
Year
12. Circle operations you have had:
Back SLA Heart MC Kidney SLA Eyes SLA Joint SLA Neck SLA
Ears SLA Hernia SLA Lung SLA Other _____

13. Please circle any of the following for which you have been diagnosed or treated by a physician or health professional:

Alcoholism <i>SEP</i>	Diabetes <i>SEP</i>	Kidney problem <i>MC</i>
Anemia, sickle cell <i>SEP</i>	Emphysema <i>SEP</i>	Mental illness <i>SEP</i>
Anemia, other <i>SEP</i>	Epilepsy <i>SEP</i>	Neck strain <i>SLA</i>
Asthma <i>SEP</i>	Eye problems <i>SLA</i>	Obesity <i>RF</i>
Back strain <i>SLA</i>	Gout <i>SLA</i>	Phlebitis <i>MC</i>
Bleeding trait <i>SEP</i>	Hearing loss <i>SLA</i>	Rheumatoid arthritis <i>SLA</i>
Bronchitis, chronic <i>SEP</i>	Heart problem <i>MC</i>	Stroke <i>MC</i>
Cancer <i>SEP</i>	High blood pressure <i>RF</i>	Thyroid problem <i>SEP</i>
Cirrhosis, liver <i>MC</i>	Hypoglycemia <i>SEP</i>	Ulcer <i>SEP</i>
Concussion <i>MC</i>	Hyperlipidemia <i>RF</i>	Other _____
Congenital defect <i>SEP</i>	Infectious mononucleosis <i>MC</i>	

14. Circle all medicine taken in last 6 months:

Blood thinner <i>MC</i>	Epilepsy medication <i>SEP</i>	Nitroglycerin <i>MC</i>
Diabetic <i>SEP</i>	Heart rhythm medication <i>MC</i>	Other _____
Digitalis <i>MC</i>	High blood pressure medication <i>MC</i>	
Diuretic <i>MC</i>	Insulin <i>MC</i>	

15. Any of these health symptoms that occurs frequently is the basis for medical attention. Circle the number indicating how often you have each of the following:

5 = Very often
 4 = Fairly often
 3 = Sometimes
 2 = Infrequently
 1 = Practically never

a. Cough up blood <i>MC</i> 1 2 3 4 5	g. Swollen joints <i>MC</i> 1 2 3 4 5
b. Abdominal pain <i>MC</i> 1 2 3 4 5	h. Feel faint <i>MC</i> 1 2 3 4 5
c. Low-back pain <i>MC</i> 1 2 3 4 5	i. Dizziness <i>MC</i> 1 2 3 4 5
d. Leg pain <i>MC</i> 1 2 3 4 5	j. Breathless with slight exertion <i>MC</i> 1 2 3 4 5
e. Arm or shoulder pain <i>MC</i> 1 2 3 4 5	k. Palpitation or fast heart beat <i>MC</i> 1 2 3 4 5
f. Chest pain <i>RF MC</i> 1 2 3 4 5	l. Unusual fatigue with normal activity <i>MC</i> 1 2 3 4 5

Part 3. Health-related behavior

16. *RF* Do you now smoke? Yes No

17. *RF* If you are a smoker, indicate number smoked per day:

Cigarettes: 40 or more	20-39	10-19	1-9
Cigars or pipes only: 5 or more or any inhaled	Less than 5, none inhaled		

(continued)

18. *RF* Do you exercise regularly? Yes No
19. How many days per week do you accumulate 30 minutes of moderate activity?
0 1 2 3 4 5 6 7 days per week
20. How many days per week do you normally spend at least 20 minutes in vigorous exercise?
0 1 2 3 4 5 6 7 days per week
21. Can you walk 4 miles briskly without fatigue? Yes No
22. Can you jog 3 miles continuously at a moderate pace without discomfort? Yes No
23. Weight now: _____ lb. One year ago: _____ lb. Age 21: _____ lb.

Part 4. Health-related attitudes

24. *RF* These are traits that have been associated with coronary-prone behavior. Circle the number that corresponds to how you feel:
- 6 = Strongly agree
5 = Moderately agree
4 = Slightly agree
3 = Slightly disagree
2 = Moderately disagree
1 = Strongly disagree
- I am an impatient, time-conscious, hard-driving individual.
- 1 2 3 4 5 6
25. List everything not already included on this questionnaire that might cause you problems in a fitness test or fitness program:

Code for Health Status Questionnaire

The following code will help you evaluate the information in the Health Status Questionnaire.

EI = Emergency Information—must be readily available.

MC = Medical Clearance needed—do not allow exercise without physician's permission.

SEP = Special Emergency Procedures needed—do not let participant exercise alone; make sure the person's exercise partner knows what to do in case of an emergency.

RF = Risk Factor for CHD (educational materials and workshops needed).

SLA = Special or Limited Activities may be needed—you may need to include or exclude specific exercises.

OTHER (not marked) = Personal information that may be helpful for files or research.

APPENDIX E

MINI-MENTAL STATUS EXAMINATION



Date of Examination _____ Examiner _____
 Name _____ Age _____ Years of School Completed _____

Instructions: Words in boldface type should be read aloud clearly and slowly to the examinee. Item substitutions appear in parentheses. Administration should be conducted privately and in the examinee's primary language. Circle 0 if the response is incorrect, or 1 if the response is correct. Begin by asking the following two questions:

Do you have any trouble with your memory? May I ask you some questions about your memory?

ORIENTATION TO TIME	RESPONSE	SCORE (circle one)	
What is the... year?	_____	0	1
season?	_____	0	1
month of the year?	_____	0	1
day of the week?	_____	0	1
date?	_____	0	1

ORIENTATION TO PLACE*

Where are we now? What is the...			
state (province)?	_____	0	1
county (or city/town)?	_____	0	1
city/town (or part of city/neighborhood)?	_____	0	1
building (name or type)?	_____	0	1
floor of the building (room number or address)?	_____	0	1

*Alternative place words that are appropriate for the setting and increasingly precise may be substituted and noted.

REGISTRATION*

Listen carefully. I am going to say three words. You say them back after I stop. Ready?
 Here they are... APPLE [pause], PENNY [pause], TABLE [pause]. Now repeat those words back to me.
 [Repeat up to 5 times, but score only the first trial.]

APPLE	_____	0	1
PENNY	_____	0	1
TABLE	_____	0	1

Now keep those words in mind. I am going to ask you to say them again in a few minutes.

*Alternative word sets (e.g., PONY, QUARTER, ORANGE) may be substituted and noted when retesting an examinee.

ATTENTION AND CALCULATION [Serial 7s]*

Now I'd like you to subtract 7 from 100. Then keep subtracting 7 from each answer until I tell you to stop.

What is 100 take away 7?	[93]	_____	0	1
If needed, say: Keep going.	[86]	_____	0	1
If needed, say: Keep going.	[79]	_____	0	1
If needed, say: Keep going.	[72]	_____	0	1
If needed, say: Keep going.	[65]	_____	0	1

*Alternative item (WORLD backward) should only be administered if the examinee refuses to perform the Serial 7s task. →

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Reorder #RO-4740

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Substitute and score this item only if the examinee refuses to perform the Serial 7s task.

Spell WORLD forward, then backward.

Correct forward spelling if misspelled,
but score only the backward spelling.

(D = 1) (L = 1) (R = 1) (O = 1) (W = 1) _____
(0 to 5)

RECALL

RESPONSE

SCORE

(circle one)

What were those three words I asked you to remember? [Do not offer any hints.]

APPLE	_____	0	1
PENNY	_____	0	1
TABLE	_____	0	1

NAMING*

What is this? [Point to a pencil or pen.]

_____ 0 1

What is this? [Point to a watch.]

_____ 0 1

*Alternative common objects (e.g., eyeglasses, chair, keys) may be substituted and noted.

REPETITION

Now I am going to ask you to repeat what I say. Ready? "NO IFS, ANDS, OR BUTS." Now you say that.

[Repeat up to 5 times, but score only the first trial.]

NO IFS, ANDS, OR BUTS. _____ 0 1

Detach the next page along the lengthwise perforation, and then tear it in half along the horizontal perforation. Use the upper half of the page (blank) for the Comprehension, Writing, and Drawing items that follow. Use the lower half of the page as a stimulus form for the Reading ("CLOSE YOUR EYES") and Drawing (intersecting pentagons) items.

COMPREHENSION

Listen carefully because I am going to ask you to do something.

Take this paper in your right hand [pause], fold it in half [pause], and put it on the floor (or table).

TAKE IN RIGHT HAND	_____	0	1
FOLD IN HALF	_____	0	1
PUT ON FLOOR (or TABLE)	_____	0	1

READING

Please read this and do what it says. [Show examinee the words on the stimulus form.]

CLOSE YOUR EYES _____ 0 1

WRITING

Please write a sentence. [If examinee does not respond, say: Write about the weather.]

0 1

Place the blank piece of paper (unfolded) in front of the examinee and provide a pen or pencil. Score 1 point if the sentence is comprehensible and contains a subject and a verb. Ignore errors in grammar or spelling.

DRAWING

Please copy this design. [Display the intersecting pentagons on the stimulus form.]

0 1

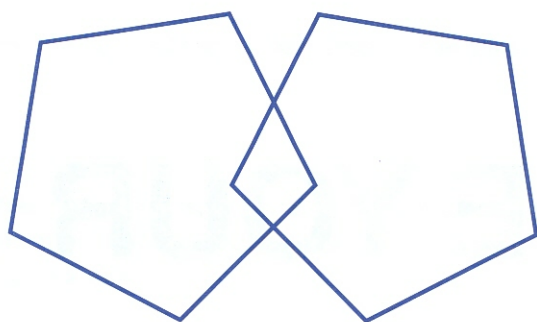
Score 1 point if the drawing consists of two 5-sided figures that intersect to form a 4-sided figure.

Assessment of level of consciousness.

Total Score = _____
(Sum all item scores.) (30 points max.)

Alert/ Responsive	Drowsy	Stuporous	Comatose/ Unresponsive
----------------------	--------	-----------	---------------------------

CLOSE YOUR EYES



APPENDIX F

FUNCTIONAL STATUS INDEX

Functional Status Index

(Courtesy of Jette, 1980)

<u>Activity</u>	<u>Assistance(1-5)</u>	<u>Pain(1-4)</u>	<u>Difficulty(1-4)</u>
Mobility			
Walking inside	_____	_____	_____
Climbing up stairs	_____	_____	_____
Rising from a chair	_____	_____	_____
Personal care			
Putting on pants	_____	_____	_____
Buttoning a shirt/blouse	_____	_____	_____
Washing all parts of the body	_____	_____	_____
Putting on a shirt/blouse	_____	_____	_____
Home chores			
Vacuuming a rug	_____	_____	_____
Reaching into low cupboards	_____	_____	_____
Doing laundry	_____	_____	_____
Doing yardwork	_____	_____	_____
Hand activities			
Writing	_____	_____	_____
Opening a container	_____	_____	_____
Dialing a phone	_____	_____	_____
Social activities			
Performing your job	_____	_____	_____
Driving a car	_____	_____	_____
Attending meetings/ Appointments	_____	_____	_____
Visiting with friend/relatives	_____	_____	_____
<hr/>			
TOTALS	_____	_____	_____

VITA

Fernanda Holton was born in Santos, São Paulo, Brazil, in 1981. She grew up in Brazil and received her diploma from Colégio Nacional High School in 1998. She moved to the United States in 2002 and received her Bachelor of Science degree in kinesiology with a concentration in fitness studies from Louisiana State University in August 2005. Fernanda will receive her Master of Science degree in kinesiology, exercise physiology concentration, from Louisiana State University, in August 2007. During the last year of her graduate program, she accepted an Exercise Technologist position at Pennington Biomedical Research Center in Baton Rouge, Louisiana.